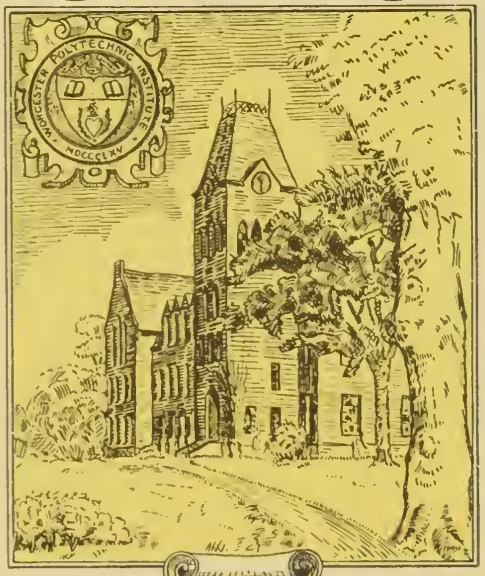

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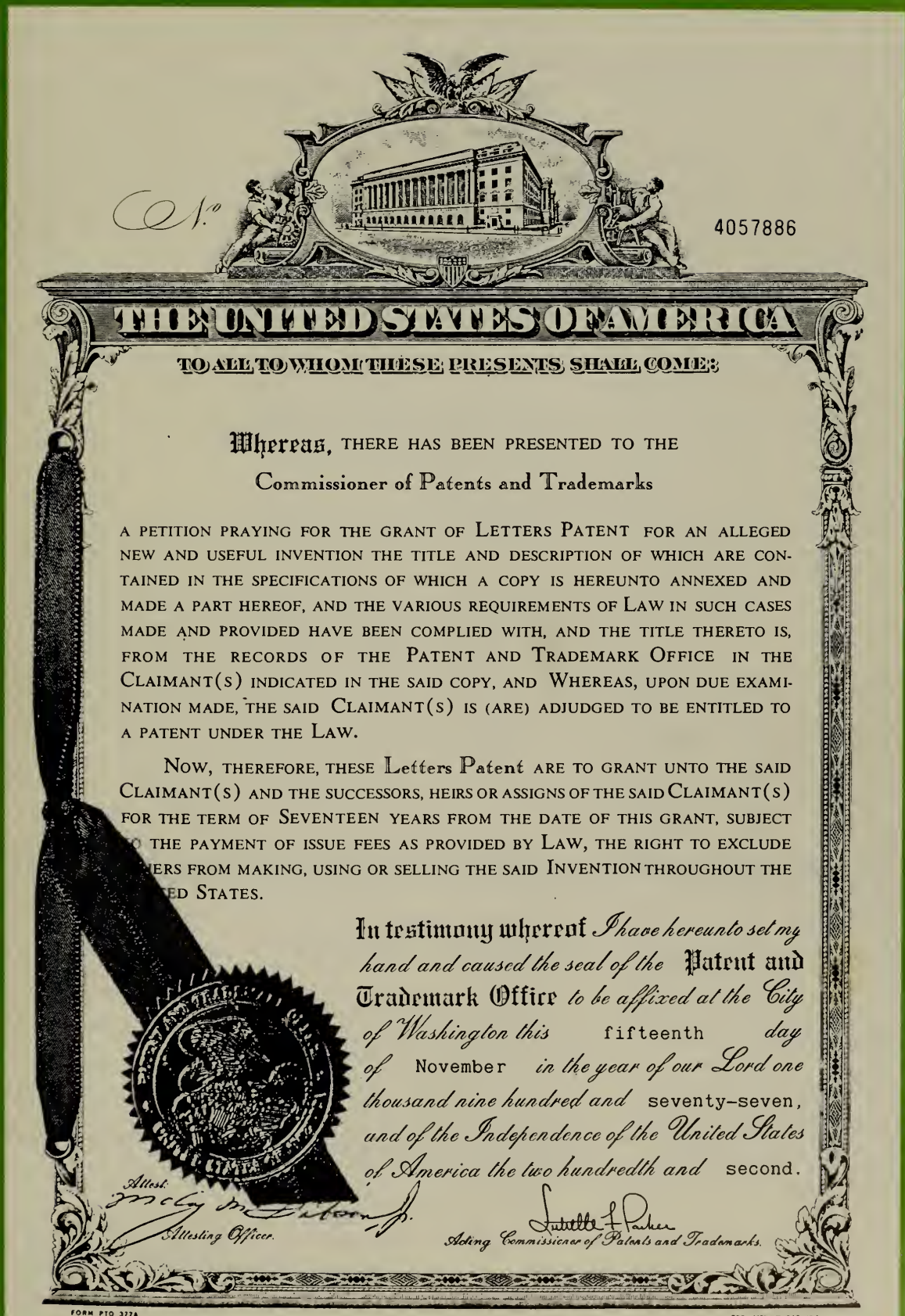

No. 4057886

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas, THERE HAS BEEN PRESENTED TO THE

Commissioner of Patents and Trademarks

A PETITION PRAYING FOR THE GRANT OF LETTERS PATENT FOR AN ALLEGED NEW AND USEFUL INVENTION THE TITLE AND DESCRIPTION OF WHICH ARE CONTAINED IN THE SPECIFICATIONS OF WHICH A COPY IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PATENT AND TRADEMARK OFFICE IN THE CLAIMANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID CLAIMANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A PATENT UNDER THE LAW.

NOW, THEREFORE, THESE Letters Patent ARE TO GRANT UNTO THE SAID CLAIMANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID CLAIMANT(S) FOR THE TERM OF SEVENTEEN YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF ISSUE FEES AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM MAKING, USING OR SELLING THE SAID INVENTION THROUGHOUT THE UNITED STATES.

In testimony whereof *I have hereunto set my hand and caused the seal of the* **Patent and Trademark Office** *to be affixed at the City of Washington this* fifteenth *day of* November *in the year of our Lord one thousand nine hundred and* seventy-seven, *and of the Independence of the United States of America the two hundredth and* second.

Attest:
Attesting Officer.

Acting Commissioner of Patents and Trademarks.

FORM PTO 377A
(REV. 11-76)

GPO 1976 O 223 453

EUREKA!

WPIjournal

Vol. 85, No. 1 Summer 1981

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Alumni Attitudes: Some Answers

THE WPI ALUMNUS: how does he or she feel about WPI in general and about the alumni program in particular?

The WPI Alumni Association, in order to strengthen and improve its overall program, wanted to learn the answers to these questions. In March, alumni attitudinal surveys forms were mailed to 11,716 WPI alumni, and the preliminary results have been very gratifying. By the April 20th deadline, 2,874 replies had been received. An excellent response! (Another 250 replies, as yet not analyzed, were received after the April deadline.)

The strong 25% response to the Alumni Attitudinal Survey is indicative of the interest, concern, and support for WPI and the alumni program found in the alumni body.

AND WHAT ABOUT current alumni? Who actually mailed back the questionnaires? The distribution of responses to the survey pretty well followed the general alumni population, whether by class, age, or sex. In all, 2,743 men, 89 women—and another 42 who apparently weren't sure—responded to the survey. The heaviest response came from the 1971–80 classes, who account for 36% of all WPI alumni and whose responses were 35% of the total received. Just under half those who returned questionnaires currently live within 200 miles of WPI.

In the occupational category, the greatest number of replies came from engineers (30%), followed by managers (28%), and retired persons (13%). Alumni engaged in sales and marketing accounted for 7% of the responses.

The most prevalent salaries reported by alumni were in the $25,000 to $50,000 range (52%), with 19% in the $15,000-$25,000 bracket and 12% in the $50,000 to $75,000 category. Sixty-five persons listed an income of over $100,000.

TURNING TO the qualitative judgments expressed by the respondees, the college fared well in terms of general image, reputation, and prestige. For example, 1,118 alumni, or 38.9%, gave WPI a "One of the Best" rating. 49% said above average, while 7% graded WPI as average. Only 48 people (just 1.7%) felt WPI was below average.

A similar pattern evolved when alumni were asked how they would rate their WPI education when compared to that received by other engineering or science graduates. Nearly 90% rated their WPI education as superior. And two-thirds would definitely recommend a WPI education to a relative.

When asked about WPI's relationship with its alumni, 22% of respondents felt it was excellent, 57% good, 13% fair, and only 1.6% poor.

On the financial side of the picture, 84% of the respondees had contributed financially to WPI, with 69% contributing annually and 23% intermittently. 64% replied they would be willing to increase (or begin) contributions in order to keep WPI a small, high quality private college.

The quantity, quality, and effectiveness of WPI alumni mailings received high marks. Most felt the quantity was about right, with 25% noting its quality was excellent and 62% good. Overall, 70% believed the mailings were effective.

Alumni news won the popularity contest as the topic alumni most wanted to see in college publications, being mentioned 2,134 times. Educational topics drew 1500 replies; campus life, 1475; faculty profiles, 1357; and technical topics, 1257. Interest was also shown in athletics, 851, and financial information, 740.

There seemed to be a general impression that alumni received more fund-raising mail than was actually the case. During a 12-month period, a typical non-donor may receive 7 pieces of fund-raising literature from WPI, out of a total of approximately 28 pieces of alumni mail. While 56% believed (accurately) that one-fourth was fund-oriented, another 27% thought fund-raising accounted for up to half of alumni mail.

IN ORDER TO SUMMARIZE and analyze the questionnaires received, the survey committee, chaired by Paul Kennedy, '67, enlisted the support of the statistical group of the WPI mathematical sciences department. WPI Seniors Bonnie Cook and Tom Hryniewicz provided the computer programming, which incidentally, produced a printout eight inches thick! They used information provided by a group of ten undergraduate students who input the responses into the computer.

Barbara Ziff, manager of information and support services in WPI's University Relations office, reports that "it was interesting to watch the attitude and enthusiasm of these students, for not only did they enjoy what they were doing, they also showed considerable pride in WPI and reacted quite strongly when alumni responded with negative comments that they thought were inappropriate."Adds Chairman Kennedy: "Perhaps this speaks well for the pride and concern being instilled in our undergraduates. Hopefully, it will carry over into their alumni days."

THESE ARE ONLY the preliminary findings of the Alumni Attitudinal Survey. They show some definite trends, and different patterns based on geography and age breakdowns. (One member of the Class of 1928 set a precedent, if not a trend. He included an unsolicited $1000 gift to the Alumni Fund with his completed survey!)

In the next issue of the *Journal*, more complete data from the survey and the essay questions will be analyzed. Even at this preliminary stage, reliable data has been obtained which will ultimately help in the reevaluation of the WPI alumni program. Information received from the Alumni Attitudinal Survey is expected to provide the foundation and basis for increased effectiveness of alumni activities in the months and years to come.

EUREKA!
an inventor's point of view

by Robert Brass, '57

THE QUESTIONS THAT POP into everyone's mind when talking with an inventor are: How do you get ideas? Once you have an idea, how do you sell it? Why are you an inventor? Why do you risk this? To answer some of these, I'd like to recount some significant events that have shaped my recent decision to cut the umbilical cord to the corporate world and become an independent inventor.

I did my first inventing at the age of 15, when I invented three board games, which I considered better than the commercial board games my friends and I sat around playing. Youth has a certain amount of enthusiasm which is never dulled by reality. One of these games, called "Pirates," I submitted to Milton Bradley about 20 years later—with the expected result. They sent it back to me and said "Sorry, but we've seen this one before"—in nicer terms, of course.

My first significant invention—a mechanized homecoming display—came while I was at WPI. For homecoming at Sigma Phi Epsilon, we created a rather large conveyor belt with a dummy of a Tech student, who went from station to station to station, one for each year of college. The junior station had a large screw that gradually descended into the student and then withdrew. Then the senior station, entitled "industry," was in fact just a cliff. That was my first "public" invention.

I spent the summer of my junior year working at Bell Laboratories, where there were people whose names I had read about in books, people like Bodie, Nyquist, Shockley, etc.—all the so-called key names at that time. I did two significant things that summer—making a toy and joining the $10,000 Club.

I have to explain about the $10,000 Club. When transistors were first delivered from Western Electric, they charged $100,000 per shipment. I was there at Bell Labs the summer the first shipment came in, with 10 transistors in it. I had the distinction of dropping one on the floor. For the induction ceremony to the exclusive $10,000 club, I had to feed a goldfish to the pet piranha.

Through a curious series of circumstances, I ended up as a computer designer. I want to state that up front, because there was no such thing as computer science back in 1957. In fact, there was just that funny company up in Poughkeepsie that kept coming up with these things called digital computers. At WPI it was the analog people vs. the digital people.

We were working on something called electronic switching, where we used transistors to perform the switching functions previously done by relays. Very primitive by today's standards. I was asked to teach a course in designing what we call multifunctional circuits. A gentleman named Clarence Lovell was listed as the instructor. I didn't realize that merely meant he would *choose* the instructor. I was very thrilled about taking the course, but he called me in one day and said,

"By the way, congratulations; you're teaching it." I really didn't know anything about the subject, so there I was in the fabled position—keeping just one lecture ahead of the class. To make it things even more difficult, these students were my classmates.

At Bell Labs our three-year program included two years to get a master's degree. My master's degree took one extra year. And since I'm talking about what inventors are like, I have to tell you why it took me that extra year. When I was in school, one of my most difficult challenges was to concentrate on learning. What I really wanted to do was to go out and create.

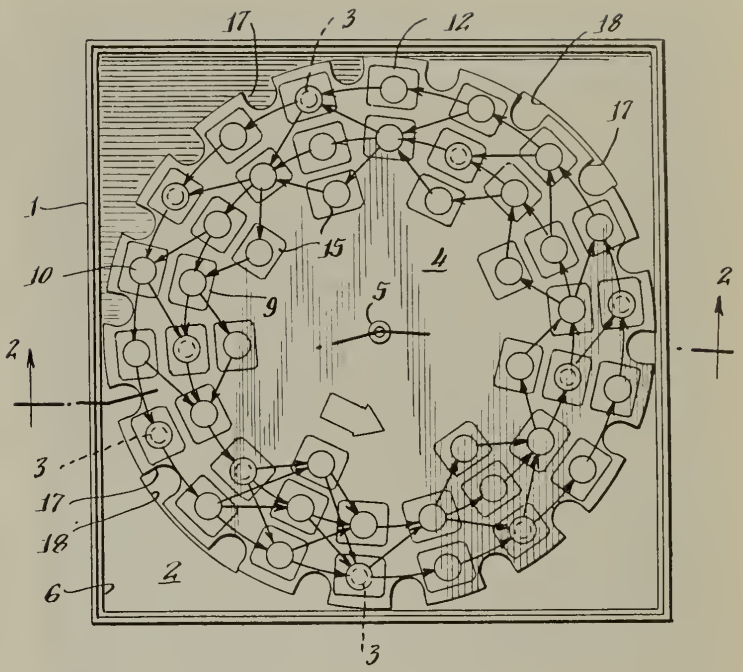
When I graduated from WPI, my goals for the summer were enjoying myself and going to the movies in the middle of the week. Like everybody else in this class entering Bell Labs, I was told I didn't have sufficient mathematical background so, guess what, I was to have a six week, high-pressure course to learn real and complex variables.

But I was determined to enjoy my summer as planned, so, while everyone else prepared for real and complex variables, I worked on various electronic devices. As a result, I had to spend an extra year making up that course.

This characteristic, in a sense, is a part of the curse of being an inventor. It's very difficult to accept what is. As a matter of fact, the key to being an inventor is that you have to reject what already exists. You have to look at something and say, "I reject that. It's inadequate. I can make something better." It takes a certain amount of arrogance sometimes, certainly a bit of ego, to think you can do something better—because most of the time it doesn't work out that way.

Because I was still studying in that third year, I got to take courses not then offered in colleges—the design of computer circuits was a good example. This subject simply was not being taught in any college in the Northeast. So, suddenly here I was teaching how to design computer circuits.

When I was through with that course, I was asked to work on a little thing called an Autonomous Call Module. Now, in digital electronics, a flip-flop is one memory unit. Nowadays we have chips the size of your thumb which have 16,000 or 64,000 memory units in them. The device I was working on then had 75 flip-flops in it. Since I knew how to design computer circuits, I got the assignment of designing this. It was a very low priority item at the time, but it turned out, through a series of flukes, that this one little thing with 75 flip-flops ended up being a computer all by itself. And that's what really began my career of serious invention.



I TALKED BEFORE ABOUT REJECTING WHAT ALREADY EXISTS. There's another way in which rejection plays a key role in the life of an inventor. Nine out of ten of the inventions that I have submitted have been turned down—politely, usually. At first this was very emotionally difficult to accept. Being able to live with rejection is one of the things that is necessary for invention.

You may have played a machine game, called "Ski and Score," where you stand on top of a pedal-controlled device and monitor a little skier. As you move your feet back and forth, the little skier moves back and forth along the surface of a rapidly moving carpet. This was originally designed as a full sized unit called "Ski Deck." The investor behind the large device thought it would be great to turn that big deck into a little deck, put little people on it, and turn it into a coin-op game. That hit the market in 1962.

The royalties from "Ski and Score" were the first tangible reward for any of my inventions. I netted 15 percent of all the money that came in. Considering all of the time I put into developing the device, I ended up making something like $2 an hour. But it whetted my appetite.

I was still enjoying working life at Bell Labs. But I had had a few promotions, and the next logical step becamme going into management. I took that step reluctantly, because I was then accepting less time to invent and more time taking care of other people's problems.

After eight years of managing, I felt that the fun had gone out of Bell Labs. An entrepreneurial spirit began to push at me. I'd always wanted to be independent. So I decided to leave Bell Laboratories, albeit with a great deal of regret.

So I left. Realizing that Bell Laboratories was really an extension of college, that I did not truly have an understanding of what the outside world was like, I decided to go into consulting. I joined a small company called Auerbach in Philadephia and was a principal consultant with them for two and a half years. I left them for Xerox corporate headquarters in Stamford.

AT ABOUT THE SAME TIME, a very significant event occurred. I completed my first prototype board game, called "Coverup," a title which has since grown to mean something different from what I originally envisioned. I have to share with you my reaction when I first realized that I had licensed it to Parker Brothers in Canada. The dominant question in my mind was, what was I going to do with my $10 million, because Coverup was going to be a second Monopoly.

Parker Canada, on the other hand, remembers the game very well for two reasons. One, it was not terribly exciting. Two, there turned out be another Canadian game named Coverup. Here I was faced with my first reality of the world of inventing: just because you've signed a contract and just because you can say, "that's my invention sitting on the shelf," your problems aren't over. Your problems are just beginning.

I got a call asking, "What are we going to do? The other company is suing? So I hired a lawyer. My first $1,000 in legal fees uncovered the fact that the other company's Coverup was originally stolen from Parker Brothers! That took care of the problem. That game was sold, incidentally, on a night when three friends, with a quart bottle of Dewar's on one side of them and my game on the other, decided my game was the best thing they had ever played. Luckily, one of the three was the chairman of the board of Parker Canada.

One of the problems in life is knowing when to quit, and after the game bombed on the market, he revived it, maybe recapturing his own initial reaction. This was two years after the Nixon situation. But the name of the game stayed the same. Not only did this game fail once, it failed twice.

The first toy I ever licensed traces how an inventor gets an idea. I went to a small toy company named Pressman. (You may know them for making Triominoes.) I was introduced to them, by the way, by the gentleman who poured the drink for the chairman of Parker Canada. Pressman had a preschool line and after the previous year's production they found themselves with 200,000 little wheels with nowhere to roll. Could I invent a toy that would use those wheels? That was the most unusual request I've ever had. Imagine, 200,000 wheels! I told them I'd think about it.

I went home and I came up with a toy. Now, anyone who is in the business of inventing and who understands the toy industry as I do now would probably get hysterical over what I produced. It was made with two thick sheets of acrylic, which is very expensive, and some wood. The whole thing was rather large. What you did with it was to put the wheels in a slot at the top, and as you turned a crank it would pick up one wheel, drop it in another slot, and the wheel would go shooting across the floor. Not exactly thrilling and exciting, but I brought it to a very desperate company that had 200,000 wheels sitting around. They would have done *anything* to get rid of those wheels. Or so I thought.

I demonstrated my creation in the board room. The chairman was there, the top executives, all six of them. They said "Oh, that's tremendous. That's fantastic. That's great." And immediately in their minds 200,000 wheels were rolling out the factory doors.

Then, all of a sudden, someone said, "Well, wouldn't the kids get kind of bored with it?"

By the time half an hour had gone by, the world's greatest idea was teetering on the edge of disaster. Another half-hour and it was dead.

This board meeting took place on 5th Avenue and 23rd Street. I decided to walk back to Grand Central Station to think it over. What else could I do? After having imagined another million dollars net with this ridiculous little thing, I was a pauper again.

I was trudging along, when suddenly another use for the mechanism occurred to me: Why not a bank? I completely forgot about the 200,000 wheels, which I knew I couldn't use, and up came Cranky Bank. This was even more extravagant in its use of materials, but at least it was a little bit of fun. You would put some plastic coins into various tunnels, turn the crank, and it would go through the exciting routine of making noise and dropping the coin in.

When I showed Cranky Bank to the people at Pressman, they were ecstatic. The heck with the 200,000 wheels. They wanted to build a preschool line and here

was just the ideal machine for them. This toy lived about 45 minutes—until someone realized that children really don't like to save. Suddenly the toy was a host of problems. It wasn't educational; it might jam; it might break. I was really in trouble.

Again, I decided on the therapeutic walk back to Grand Central. At about 35th Street I said "Aha! I know what kids love to do. They love to telephone." (Even at this stage I was still using the same slot idea.) We added a little more play value with three slots—a nickel, a dime, a quarter. You filled the slots, turned a crank, and watched the coin come around, hit the bell, and get deposited. The slot gets filled, you turn a crank, the coin comes around, hits the bell and deposits. On this toy I hit a bullseye.

At Xerox I started on the Information Systems staff and, because I had done some programming as a consultant, I came in as a software expert. (By the way, that's a very important point. If you can maneuver yourself in industry to a title just before you leave, you can then enter the next company as an expert in that title.) I was involved with market planning and in critiquing other people's work. This was not exactly tough for me to do. I would harden myself and I could say, "Well, that's a terrible thing." However, since my entire corporate career started out as a critiquing function, I balanced my personal equilibrium by putting more and more time into inventing.

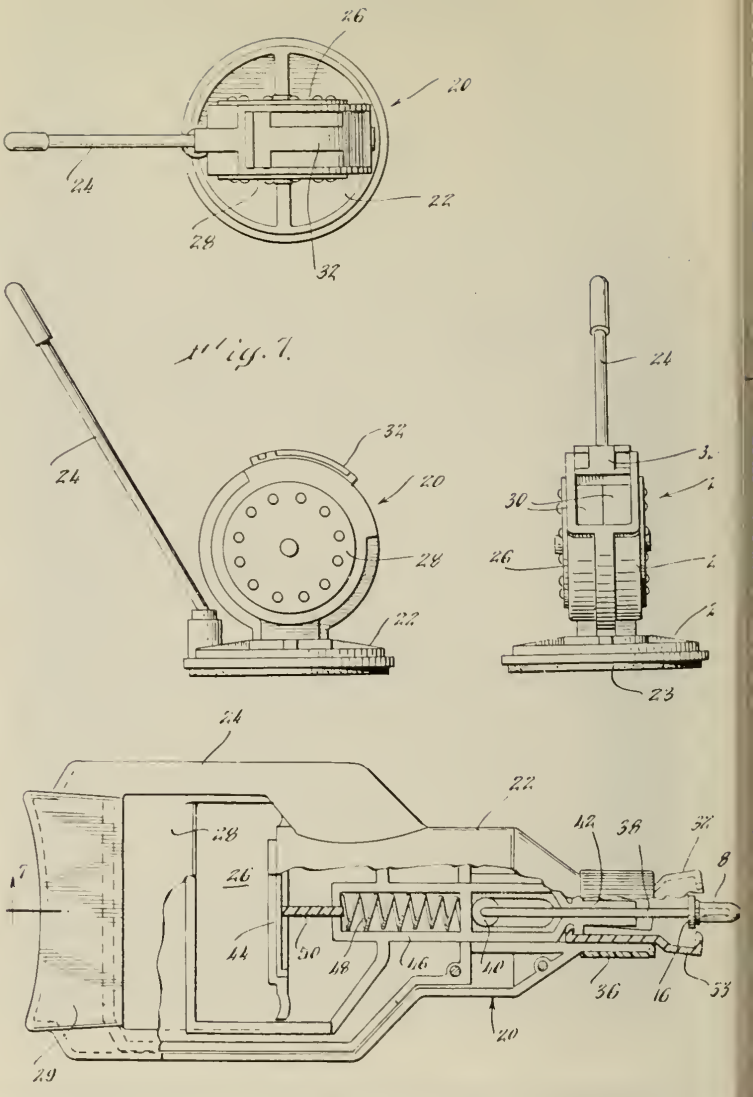
Up to today, I probably have close to 50 patents, and of those maybe three or four products are still on the market. I would not patent anything unless I had somebody to sign the license. I take a slight chance, of course, that my designs may appear under someone else's name, and that has happened to me several times. On the other hand, I save an enormous amount of money, since only one out of ten of my ideas becomes successful. If I patented everything, I would now have 500 patents and probably quite a few IOU's.

So, I started inventing and putting in a lot of time—evenings and weekends and vacations. Being independent became more and more important. Then came the first of two events occurred that changed my mind and my life. First, the Arabs turned off the oil. As I had begun to be more experienced in pre-school, my toys began to get larger and larger. Suddenly I realized that all of my inventing, all of my approaches, had dealt with plastic as though it were free. And suddenly I knew that plastic was going to be very expensive from then on. Everybody was talking about economic disaster, and since the toy industry exists on people's "extra" money, I thought it would experience problems. I felt as if I had just begun to understand the game when somebody changed the rules.

One day I sat back one day and asked myself, "What can I invent with very little plastic in it?" I'd like to share with you a couple of things that emerged. I decided to invent items with relatively small proportions of plastic to keep costs down. One was called "Lost Gold", a game that featured a little device called a gold finder, inside of which was a detector. The "gold" nuggets which you hid underneath the platform were magnetic, and as the detector went over, it would flip into one position. You'd track the playing field to determine whether you'd uncovered gold or not—very much like a modern version of Battleships. I was very excited about this game.

I remember at one point I thought that all I would really like to do, for my own self-fulfillment, was to have one game, just one game, licensed with Parker Brothers. As far as I'm concerned, they are the best toy company in the United States—in terms of their ethics, their approach, their professionalism. I got that game licensed with Parker Brothers, and it was my first real break. Even though the price was high, hundreds of thousands of the games were sold, providing some nice royalty income. I had licensed quite a few things with Pressman, but now this was the big time.

Another game I invented at that time was a platform board that rotated, with a series of magnets underneath. When a turtle (which had a piece of metal in it) went over the magnet, his head popped in and the turtle "went to sleep."



►On designing toys for children:
I don't design toys for children. That isn't my focus. I design them for me. I have never designed a doll, because I don't enjoy playing with dolls. I invented these things I've talked about because I enjoyed the concept of them. Maybe that's why nine out of ten are rejected—I liked them but the children didn't.

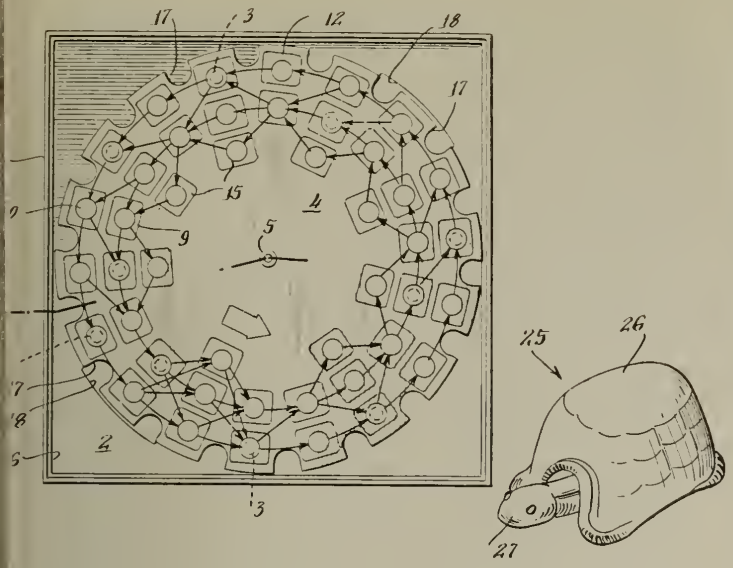
►On royalties:
How does an inventor get paid? Royalties are the key. Royalties are a delight—when you get them. The United States was built on the concept of the individual inventor. The tax structure and the patent structure favor the individual inventor, because the inventor makes capital gains. If you can possibly avoid it, you never sell an invention. You license it. And when you license an invention, the normal terms are 5 percent of the gross sales—not profit, but gross. This is all treated as capital gains.

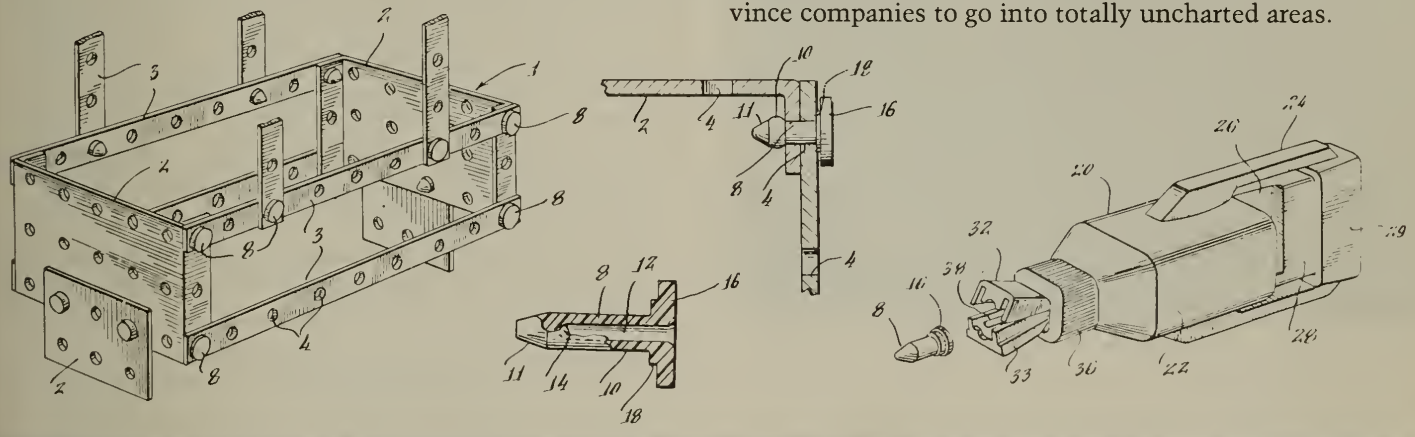
►On what you need to know:
To me, the toy business is a microcosm of American industry. Product development cycles are about a year and a half long. Every single process in making an automobile, for example, is found in some of the smaller toys. Some of them get very sophisticated and very complex. If you're going to be involved in inventing, you should know law, accounting, taxes, you should be able to sit and work practically every machine tool.

I took a summer course where I learned how to use every machine tool in Washburn Shops. The more information you can get about how industry works, every aspect of industry, including marketing, the better it is for you.

►On how to find out what you need to know as an inventor (such as what sort of rubber to use in making Riviton rivets):
I read a lot, and I ask a lot people a lot of questions. Shell Oil has somebody called the Shell Answer Man, whom you can call and say, "I'm interested in a plastic that does the following." If he doesn't know, he'll connect you to the people in the company who do know.

Any information you want can generally be gotten within five telephone calls. There's always somebody willing to give it to you. You can go to the federal government—they're often very helpful, if you're willing to flatter some of the people there. On the other hand, I have found that private industry is extremely interested in helping.





To give you an idea of the fickleness of the inventing business, I brought "The Great Turtle Race" to my friend who was vice president of research at Parker Brothers. He liked it immediately. I started counting my royalty checks again. Although the game lasted on the Canadian market for three or four years, it never appeared in the United States. The reason was that there was no established market at that time for a relatively high priced children's game.

This are both positive and negative aspects to inventing. One of the easiest ways to invent is to make something that resembles another item. For example, after Mastermind came out, there were copies all over. Lots of people copied Scrabble. Rubik's Cube is now a very popular game, and we'll be seeing all sorts of variations and versions. For some reason, everybody feels safe doing that. On the other hand, me-too products often become disasters. It is up to the inventor to convince companies to go into totally uncharted areas.

►On having ideas stolen:
I'm aware of at least two inventions that were stolen from me. I have two ways of dealing with it. First, in making a large number of inventions, I assume some will be stolen. Second, I deal only with people I know are ethical. Now, how do I know that? I find out when they're not ethical.

The industry I have dealt primarily with, the toy industry, has to thrive on ethics. As soon as a company is known as non-ethical, the independent inventor does not go there.

The two ideas stolen from me were not taken by companies. Although you can say a company is not ethical, it is more often individuals within the company who are the real culprits. I brought an idea to a major toy company. An R&D person working for that company saw the idea, quit, suddenly became an "independent inventor," and sold that idea to another company. It came out in the exact same configuration, and he even used the same name I had chosen. I did not bother to pursue that one, because unfortunately it just wasn't worth it. On the other hand, if you have one good idea, like a Chester Carlson (inventor of the electrostatic photocopier), the best thing to do is to either get someone to underwrite you so you can get protection, or just deal with people you know are ethical. As I've said, the problem is more often with individuals than companies, and I really don't know how to handle that. Being an inventor is sometimes tough.

I go to only five or six companies, and in them I have personal friends I see. I trust those people as individuals. One happens to be president of Schaper (the Cootie company), another is a vice president at Parker Brothers. These are usually key people whom I know and trust on a personal basis.

The first time I go to any company, I will never bring something I think is really exciting. I always give something that isn't quite as exciting to see what the reaction is. If you trust your instincts towards people, and you deal with people you trust, you have a pretty good shot.

►When a toy is rejected:
I normally design a toy or game with a particular company in mind. Every company has a personality. Quite often if I get rejected I just stop right there. I'd say half of my inventions are submitted to just one company. The rest of the time, I may try a second company; I've never gone to more than three. There are just so many bruises I can take!

AT THIS TIME I should mention the significant event that changed my life. It involved a toy called Riviton. Let me describe Riviton, how it was created, what happened to it, and why it significantly altered my life—and why, because of Riviton, I'm here today.

I've always enjoyed construction sets. When I was young, I just couldn't wait for the newest Erector Set to come out. I made the parachute jump, and the walking robot, and I thought they were just terrific. A few years ago I got around to looking at the available construction sets, and it seemed as if the Erector Set was the only really flexible one. I said to myself, "Gee whiz, there's not much around."

The inspiration came one very hot day, when I was having some beer from a quart bottle. After drinking half a glass, I decided I really didn't want any more. How could I seal the bottle? If you've every tried to put beer back into the refrigerator to drink the next day, you know the problem. Well, there is a handy little device, made of rubber, looks something like the top end of a hypodermic needle. You depress in the top, insert the stopper into the bottle, release the top, and the lower part expands. Eureka! Why not use that technique as a fastening device for an erector-type set?

Four years elapsed between that decision and its coming out on the market. The Riviton set used little rubber rivets and plastic plates, with an erector set configuration. It was very easy to use. A little fastening tool would grab the rubber rivet, pull it back, stretch it and make it thinner. When you put it into the hole and released it, the rivet would expand.

Parker Brothers introduced that set in 1976. It was one of the most successful introductions of a product in the company's history. 25,000 people wrote in unsolicited comments which were 99 percent favorable. Parker Brothers was headed toward a huge sellout in the next year, and all of a sudden my dreams for what I wanted to do were *really* about to be realized. Now my financial needs would be taken care of. Now I could go out and be independent.

Riviton came out in 1976, and was a huge sellout at Christmas. Then in January, when I was working on the next year's models, a Parker Brothers manager called me in to say we had a slight problem. We couldn't tell if it would be serious. A child had swallowed a rivet, along with some food. It got into the child's throat, then lodged in the lung, and the child died. At that point the tragedy hit me just a little bit. I guess I rationalized it to myself, thinking it happened with food, the so-called restaurant syndrome. The problem really came home to roost later that year. A phone call three days before Thanksgiving told me a second child had inhaled a rivet and died.

Needless to say, a lot of things evaporated right then. First was my so-called financial freedom, my ticket to do whatever I wanted to do. Second, I had to deal with the thought of being indirectly responsible for the deaths of two children. Third, my shot at immortality was gone.

Riviton sales were heading towards the $10 million mark the second year alone, when my whole world came to a screeching halt. At that point, Parker Brothers asked me to stop receiving royalties. They withdrew the game from the market and offered a refund to everyone who owned the game. General Mills took an $11 million write-off. That, plus two human lives, was the cost of Riviton.

I can talk about it in a relaxed way now, but for a year I couldn't talk about it at all. I couldn't go into a toy store, I couldn't consider inventing anything. But time soothed me, and I finally stopped worrying about it. I began to think about all the implications of my inventions, and why I was so distraught. Were my dreams of independence destroyed simply because a single toy didn't make it? So I did what a good pilot will do after he crashes: get back into an airplane. I promised myself to invent another construction toy immediately.

I did it, and I brought the construction set to a toy company. I feel very comfortable that it is not dangerous, or I would not have done it. I called them today, hoping I would be able to say in this talk that they either accepted it or rejected it—and I'm very proud to announce they said they'd tell me on Friday.

Meanwhile I had made some decisions myself. I wanted to go out and be an independent inventor. This whole process of having a huge success which turned into a huge failure shook me right to my foundations. It made me realize what I really wanted to do, that I wasn't getting any younger, and that now was the time to do it. So what if I couldn't exist from now until I retire and then some, even if I never invented another thing. It would be unreasonable to assume that there would be no risk in future invention. So as a result, I made the decision.

On December 18 last year I started doing my first electronic toy. I said to myself, "Look, you started out as an engineer; why don't you go back to being one?"

This dungeons and dragons type of game did not sell. What I want to tell you, though, is that it was an intense learning experience for me. I went literally from December 18 to January 18, one full month, giving myself a total immersion course relearning electronics, relearning how to program (in hexadecimal). I emphasize this because it is a very important point. If you want to be an inventor, this is the kind of commitment you have to make—immerse yourself for a month to learn a new area or refresh an old one. And I mean getting up at 7 o'clock and working right through to 11 or 12 or 1 o'clock in the morning. You may recall that Christmas fell in that interval I'm talking about, as did New Years. I think I took New Year's Eve and Christmas morning off, but that's all. I wanted to get finished in time for what I call "silly season," the time when the manufacturers sign on their new toys and games.

The primary areas I'm going into now have nothing to do with toys and games. When I received the royalties from Riviton, I decided it was time to retain a tax attorney, who suggested a legitimate shelter, solar energy. Up to that point, I had not been involved in solar energy at all. I became involved, I became fascinated by it, I began to believe in it. And finally I founded a company, became an investor in solar energy. One of the areas I plan to invent in, and I'm creating a laboratory for, is solar energy. I will be beginning that May 1.

Other areas are computers and computer printing. Fortunately, and again through knowing people, I have been able to get advances on royalties for things I have not yet done. This is an ideal way for an inventor to operate, because it removes some of the risk. I'm in the process of forming a new company to get involved in the computer area, a company that I will have nothing to do with once it's formed. This is an ideal option for an inventor. If I can't find the company that can handle a problem, I'll form the company. That's the approach now. I hope it works.

One of the most important things I derived from working a decade at corporate headquarters at Xerox is an understanding of the way American business works. Sooner or later, every inventor has to face the chairman of the board of some company, or face major segments of the corporation, and it's very nice to know how they operate, nice to have the confidence of being able to stand up there knowing you've done it a hundred times before. I think that's a very important attribute for any inventor.

The motivation behind leaving the corporate world was 90 percent positive, in the sense that I'm going somewhere I want to go. Only 10 percent of the reason is negative, leaving something I didn't like. I want to emphasize those ratios before I describe the things I found I didn't like in corporations. (I don't mean in any way to denigrate Xerox, which is an excellent company, as are Bell Labs and Auerbach.)

The longer I was there, and the higher I went in management, format became more and more important and content had less and less value. I saw around me something I refer to as the "velvet coffin": the higher someone went in the company, the more dependent they became on the company, the less flexibility they had to make independent decisions. I was very fortunate at Xerox in having a steady source of income from outside the company, so that if I were suddenly fired it wouldn't be a crushing blow. But very few people in corporations have that kind of security. As a result, what they say, how they think, what they do, what they propose or don't propose, has job security as a very fundamental element.

I wanted to do two things. I wanted to invent for myself, yes, but I wanted also to create an environment in which inventors could flourish, an environment with a very special aspect. The longer an individual was there, the more independent he or she would become.

I've always given a percentage of my gross revenue to the people who have helped me in my inventing—and there have been a lot of them: people who have done graphic design and machining. These people love to work for me, and they're devoted. The longer I've known them, the larger the percentage I have given them.

It occurred to me that this would be a wonderful way to structure an organization. I realize inventing is somewhat unique, because success or failure is not a direct function of the number of hours you invest, but a function of how good the idea is and how well it sells. It is now my intention to create what I call an Inventors Guild: to create an environment to attract and nurture good inventors. It will be a place where they can start off working for salary, then salary plus a percentage of the gross from what they've worked on, and gradually build up until they're getting a significant portion of the gross. I want to provide administrative services that they need at cost.

This would accomplish two things. First, the emphasis is definitely where it belongs—on content, not format. But second and most important, the more that people work, and the more time they spend on what they're doing, the more *independent* they will become rather than more dependent. That has been an important element in my life. It's the kind of legacy I would like to be able to pass on to others.

Technology is the answer—but that's not the question

by Melvin Kranzberg
Callaway Professor of the History of Technology
Georgia Institute of Technology

IT IS FITTING TO LOOK AT engineering education in historical perspective, to show WPI graduates where they fit into the continuum of the engineering profession—past, present, and future. The history of the Institute is extremely informative in that regard, because WPI has played a major role in engineering education during the 115 years since its founding.

The Worcester Free Institute of Industrial Science, as it was called in 1865, was involved from its very beginning in a controversy over what was the best kind of practical training for young men—*not young women*—in an America which was rapidly industrializing. The controversy was between the advocates of what were known as the "shop culture" and the "school culture." This latter view was represented by institutions such as Stevens Institute and MIT, and where the focus was on mathematics, theoretical science, and original research as the major elements in engineering education. Worcester belonged to the "shop culture," stressing practical shopwork and producing graduates who would work as machinists and shop foremen, but who would not be especially trained in engineering analysis.

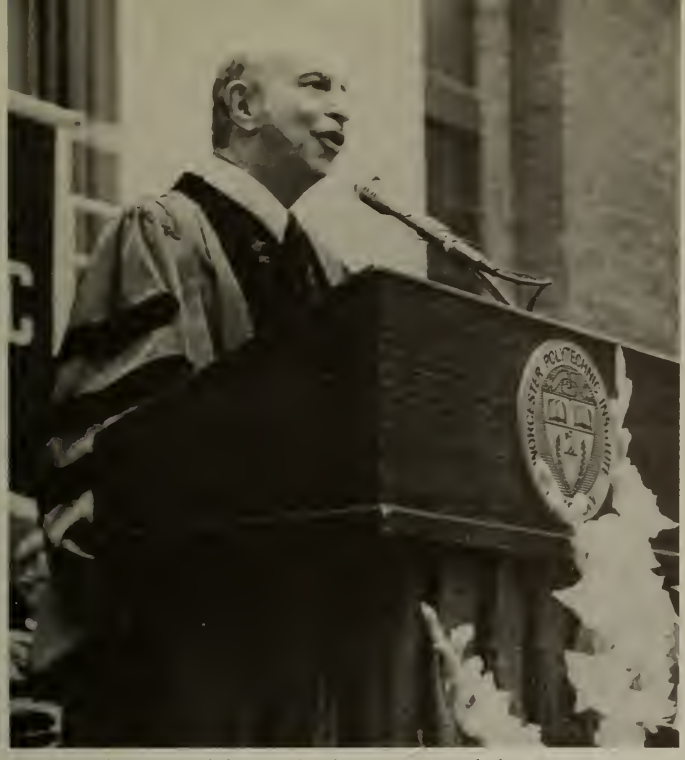
Robert H. Thurston, a leader in the mechanical engineering profession at the time, based the distinction between the two cultures on the argument that there were two different classes of people, requiring different kinds of education: one group, "brilliant of intellect," was best suited for intellectual pursuits and the professions; the other, endowed with what Thurston called "constructive faculties," consisted of individuals suited for work with their hands.

In establishing the Washburn Shops, where students were almost wholly engaged in practical training, Worcester became the national model for the shop culture. It was a "trade" school, as distinguished from what Thurston labeled the "technical" school. "The machine [was] the principal text book" in the shop culture, and items made by students in the shop were sold to procure income for the school.

So great was the success of the Worcester Free Institute's Washburn Shops that, when the state of Georgia decided that there was need for a technical institution to build up the industrial base of Henry Grady's "New South," a delegation of prominent Georgian officials and educators visited the outstanding technical institutions in the Northeast and decided to follow the Worcester model in creating the Georgia School of Technology. At its opening ceremonies in 1888, one of the orators contrasted the type of education to be offered at Georgia Tech with that provided at the University of Georgia in Athens, exclaiming: "The head is in Athens; the hands are here [in Atlanta]. We have here work versus thought; practice against theory; the shop against the study; the hammer against the book; the blouse against the cutaway."

Alas, Georgia Tech's efforts to copy the WPI model ended in failure. For one thing, while Worcester drew students from a well-developed system of public high schools, Georgia's secondary schools were so deficient that Georgia Tech had almost immediately to initiate a sub-freshman class for remedial work, simply to bring its entering students up to a collegiate level. Furthermore, the school did not succeed in luring to Atlanta those first-rate professors who had developed the Washburn Shops which had made the Worcester model so enticing. Also, the construction shop system antagonized the local manufacturers in Georgia, who objected to the competition from state-subsidized, student-made goods. By the close of the 1890s, Georgia Tech was forced to abandon the Worcester model and turn to the "school culture" type of engineering education.

But in that respect, too, Georgia Tech was again copying Worcester. Because a few years previously, the transition from a trade school to a college of engineering had begun in Worcester. By 1896, the Washburn Shops abandoned the hydraulic elevator business, hitherto their chief source of profit, and WPI was taking the leadership in the "school culture" which emerged triumphant in engineering education.



In the period from the beginning of this century through the Second World War, the old dichotomy between "school" and "shop" educations disappeared, and WPI, in common with nearly all other engineering schools, produced the stereotypical engineer of the times. He was a man who wore a mackinaw and hip-boots, who built dams, bridges, mines, electric motors, transmission lines, industrial machinery, and factories. He had become an engineer upon receiving his bachelor's degree from an engineering school, where his time was spent on good, practical courses, such as surveying, mechanical drawing, machine design, electrical circuits, and the like.

However, during and since World War II, the scope of engineering practice enlarged greatly. Although we still need engineers to do all the things which engineers did before, they are also involved in lasers, solid-state circuits, and advanced electronic equipment. Specialist engineers design nuclear reactors, synthesize elaborate chemical and biochemical compounds, rearrange the molecules in the genetic code, devise sensitive telemetering systems. Their work ranges from subatomic particles to the boundless realms of space, from mining the ocean's riches to gathering energy from the sun.

These new fields required engineers to solve different problems than they had faced only a few years earlier. The result was that the substantive content of engineering education was transformed following World War II. Mathematics and physics, with which the engineer had needed but a passing acquaintance, became part of the basic core, while practical courses in surveying and mechanical drawing became subordinate or were relegated to sub-professional or, more accurately, paraprofessional, technical institutions—which now offer degrees in what is called "engineering technology."

Many of the problems with which engineers concerned themselves—such as energy, the environment, transportation—were seen to have a "soft" side—to have social and human components. Hence the humanities and social sciences, only a miniscule part of engineering education before World War II, became recognized as essential to a complete engineering education.

In the 1970s, realizing that the world was changing and that engineers functioned in a social context which affected their engineering practice, WPI again took on a pioneering role by systematically revising the traditional approach to engineering education through the WPI Plan. Not only were curriculum requirements transformed, but a new project approach to learning was instituted, one "designed to develop a greater awareness of the relationship between science and engineering on one hand and social concern and human values on the other."

Does such an approach make sense? Well, let us look at some of the problems which current graduates will confront in the future. Among the most important is the growth in the world's population, affecting the ratio of population to resources. During Classical Antiquity, there were probably fewer than 200 million people on the entire earth—and it had taken millennia to reach that figure. By 1650 it had grown to one-half billion, and scientific and technical developments allowed it to double to one billion around about 1830. But then, with advancing industrialization, things began moving faster. By the beginning of this century, the world's population had soared to over 1.5 billion. Then it took only eighty years to more than double to today's 4.4 billion, and it is expected to double again in the next 35 years. Indeed, a projected increase of 2.26 billion between 1975 and 2000 means that the population rise during our present quarter-century would equal the entire world population increase from the time of Christ to 1950!

A short time ago, our demographers reported some heartening news: a "perceptible decline" in the rate of increase in the world's population. Instead of growing at 1.9 percent per year, as during the 1960s, the world's population increased only at the rate of 1.88 percent per year in the late 1970s. Sounds great, doesn't it? But that still amounts to 80 million more people each year. So, instead of doubling every 35 years, the world's population will now double every 37 years. Big deal!

Providing food, clothing, and shelter for this unprecedentedly rapid population growth will put great strains on our natural resources. At current rates of consumption, some resources are already being exhausted. What will happen when an exploding world population with a growing expectation of material goods begins using up resources faster than ever? Obviously, great challenges will be posed to technology to eke out existing supplies, to recycle, and to develop substitutes.

And don't think that this population problem affects only people in far-off places—in the Third-World countries of Asia, Africa, and South America. It is press-

ing upon our borders right now. Our neighbor Mexico has a population growth rate three times that of the United States; its present 68 million people might rise to 134 million by 2000. Already we are concerned about the problem of illegal immigrants to this country, most of them coming from Mexico, and we are wrestling with the problems—social, economic, education, and political—raised by this latest wave of immigration.

OUR CITIES ARE IN TRANSITION ALSO. While many older cities strive to bring about a reversal of the urban deterioration of the past two decades, the situation in the rest of the world appears to be getting worse. A study by the World Bank points out that more crowding will take place in the world's poorer cities, just exactly the places which can least afford it. In 1950 only 29 percent of the world's population lived in urban areas, but slightly over half will be living in cities by the year 2000. Some of the predictions boggle the imagination, such as the one that Mexico City may have a population of 30 million by the end of this century.

If the world's urban centers grow as predicted, not only will there be great strain on urban services—on transportation, sewage, housing, medical facilities, and the like—but there will also have to be tremendous agricultural development just to feed the growing number of people no longer engaged in food production on farms.

The changing demographic profile in our own country will also present technological problems. According to the 1980 census, the average age of Americans is higher than ever before. The median age is now 30, and it is expected to rise sharply over the next three decades. This changing age distribution of our population has major social and financial ramifications—already evident in the problems regarding the funding of the Social Security system. But it has important technological implications as well, for it will impact upon our use of resources and our nation's productivity.

Another problem involving population and the resource base is the growing need for water. The world's population grows by almost 200,000 people per day, each requiring 500 tons of water per year. Last year's population increase alone created an additional annual demand of 36 billion tons of water, or the equivalent of a medium-sized river.

Does anyone seriously believe that we can meet our future water needs by cursing technology? Or does anyone truly object to our encouraging our technology so that we can meet the energy and food needs of today and tomorrow?

Nevertheless, some proponents of a "new consciousness," or a "counter-culture," turned their backs on technology a dozen years ago. They gave us trenchant criticism of our current society, but they didn't tell us what to do when the flowers broke through the concrete pavement. They advocated a lifestyle which was very beguiling and appealing to affluent college youth. But they did not tell us how this lifestyle would solve problems like poverty and medical care distribution and resource depletion and air pollution and the hunger of most of the people throughout the world.

The problems have one thing in common: We need engineers to solve them, but the engineers cannot solve them alone. For these are "interface" problems. There is the interface between science and technology on the one hand, and society and humanity on the other. These problems can only be resolved—if they can be solved at all—with the aid of scientific knowledge, technical expertise, social comprehension, and humane compassion.

You see, technology is the answer, but it is only part of the answer. The real question is, What do we value in our lives and do we possess the national will to act upon these values? Once we have answered that question, we can ask which technology or technologies will best meet our needs.

Our modern, highly sophisticated technology gives us many different technological options we can use to cope with the many problems which beset us. Unlike earlier days, when the level of technology was so low that mankind could make only limited use of resources, we now have many technical opportunities before us. Which opportunities we grasp will depend upon our value system, the institutions which embody our values, and our willingness to make the necessary tradeoffs and decisions among competing social and economic pressures.

THE INTRUSION OF SOCIAL AND VALUE QUESTIONS into the practice of engineering has blasted engineers out of their smug complacency about the triumphs of modern technology. For many years engineers could point out how they had increased productivity, provided food, clothing, and shelter, quickened transportation, heightened communication, and the like. But over a decade ago there began a critical onslaught on technology, questioning its benefits to mankind.

When engineers could no longer shrug off questions about the worth of technology to the contemporary world, their professional societies sought to demonstrate that engineers are truly concerned about society's welfare. Sensitive to public opinion and social pressures, engineering societies within the past decade have gone to considerable trouble to strengthen their ethical codes and show their social concern. But when I ask the officers of engineering professional associations if they have ever disciplined anyone for violating their beautiful new ethical codes, I discover that the only reason they ever kick a member out is for non-payment of dues!

The second reaction of engineers to the public questioning of technology was just what you might expect; namely, advocating more technology in order to overcome the troubles which had been brought about by technology in the first place. In otherwords, they have sought a "technological fix," remedying matters by the application of more or better technology.

It is not surprising that engineers should seek solutions for problems from their own field. After all, past technical solutions had resolved many problems of food and material production, transportation and communication, and so forth. Yet each solution seemed to call forth new and unforeseen problems because engineers remained blissfully unaware of the social implications of their actions or of the possibility that a benign technology might somehow turn sour when applied on a vast scale.

Let me give you an example of how the scale of use can turn a technical panacea into a new disease. At the turn of this century the automobile was extolled as a solution to the pollution, congestion, and safety problems posed by horse-drawn transportation. That was the time when in New York City alone horses deposited some 2.5 million pounds of manure and 60,000 gallons of urine in one day. The automobile promised relief from these problems, but, as we all know, pollution, congestion, and safety problems returned in altered and heightened form as a result of the large-scale use of the automobile.

So what do we do? We angrily demand that Detroit employ a "technological fix" by changing engine design in order to do away with the dangerous exhaust and at the same time use less fuel.

But such technical solutions give us only a temporary respite from further problems, unless our technology is applied with some understanding and comprehension of the social context in which it will be employed.

This means that we have a tremendous educational job on our hands. In addition to educating engineers to an understanding of society—which we have begun to do through such programs as the WPI Plan—we have the even more difficult task of educating non-scientists and non-engineers to an understanding of science and technology and their role in society. For solutions of the interface problems of the future problems will require the efforts of all of us, not just scientists and engineers.

Do we have the courage to make difficult choices? Or have we become a nation of materialistic hedonists, as some critics say, unwilling to forego material goods and creature comforts regardless of the effects upon others now and in the future?

It might well be. Indeed, Archibald MacLeish, the poet, once said: "America was promises."

AMERICA *was* PROMISES"? Have we lost the ability to fulfill the great promise that was America?

I believe that America is still promises. One reason I believe that is that I am an historian of technology, and technological history has always been on the side of the optimist. After all, we call ours a man-made world. If that is so, I claim that man can remake it. We will need an enlightened technology to do so, one enlightened by awareness of and sensitivity to human and social parameters. This means that technology is indeed the answer—but the real question is what kind of world do we want our technology to make.

The second reason I believe that America is still promises is I teach young scientists and engineers. I am impressed with their concern for the good of mankind. Sure, they want well-paying jobs, but they also want to make the world a better place to live while pursuing their personal goals. This is exactly the same combination of idealism and practicality which motivated the builders of our nation.

That gives me confidence that we can meet the problems of the future, even though I recall that Alfred North Whitehead, the great British philosopher, once said: "It is the business of the future to be dangerous." I think that we can accept the risks with composure and confidence if we can educate our college graduates to make our technology contribute to the achievement of our human goals and the solution of the problems of our social and natural ecology.

If we professors have done our jobs properly, then our graduates should be able to do theirs. I think that they can solve the socio-technical problems of the future. I am sure that, in so doing, their success will be only partial. They will create more problems for their successors, even as my generation has done for them. I think their successors will also solve those problems, and in turn create new ones, and so history will be made. And, as an historian of technology, let me conclude by reminding you that the lesson of that history is HOPE.

"Daddy Wags"

by Ruth Trask

THERE IS LITTLE DOUBT how students feel about him. The nameplate on his cluttered desk in Goddard says it all: 'DADDY WAGS.'

Officially, Dr. Robert E. Wagner is professor of chemical engineering. For 31 years, he has taught many courses at WPI, but his favorites are "Unit Ops" and "Thermo". He advises 60 students. But it is the unofficial side of Bob Wagner, his genuine, warm concern, which has drawn a generation of students to him.

He received his nickname some ten years ago while giving impromptu lectures on the evils of drugs. One student, as deeply committed as Wagner, kept punctuating his points with, "That's right! You got it, Daddy Wags!" The name stuck.

"Last summer, my commuters presented me with the 'Daddy Wags' nameplate," he says. "They also gave me a birthday party I'll never forget. I'd been mountain climbing all day, and fell into bed before midnight. At 1:30 A.M., the doorbell rang, and I answered it in my shorts. There on the front lawn stood 20 commuters. Well, we partied and shot off fireworks until 4 A.M. Luckily, my wife Ruth had warned the neighbors!"

To say that Wagner loves climbing with a passion is an understatement. His enthusiasm for the sport is contagious, and over the years many of his students have caught the bug, especially during the treks he leads at Intersession. "This past January we had a ball," he reports. "In spite of the upcoming competency exam, about 16 of us decided to climb in Crawford Notch. The weather was terrible. About 20 below most of the time, but the air was crystal clear. We managed to climb three Presidentials: Adams, Madison, and Clinton. We also took the bridle path to the ridge below Lafayette. Once on the ridge, all the chatter about girls and good times suddenly ceased. Before us was the panorama of Liberty, Haystack, and Lafayette. The sight was breathtaking!"

Active with the Appalachian Mountain Club (AMC), Wagner has served as a vice president of the AMC in Boston and as past chairman of the Worcester chapter. He also belongs to the 4000-Footers Club, having often climbed the 46 4,000-ft. peaks in the White Mountains, as well as seventeen others in Maine and Vermont, in summer and winter. An experienced guide, in 1971 he led eight people from the East on a 14-day trek through Teton National Park in Wyoming. "In 12 days, we did nine major summits," he says, "including the Grand Teton, a 14,000-ft. peak.

Four years ago, Wagner took the vacation of his dreams. He and Ruth flew to Europe and camped in beautiful locations throughout the Alps for $3 a night. In mid-vacation they were joined by a climbing companion and his wife. While the wives toured in their new Audi, Bob and his friend did the Dolomites and Austrian Alps, tramped over glaciers, and climbed out of Zermatt. Along the way, they admired great waterfalls, summer snow fields, Alpine flowers, unique formations of soft limestone, and from afar, the Matterhorn. ("Hope to climb it next time.")

Wagner, a registered professional engineer with degrees from Drexel and Princeton, is not always climbing mountains or teaching. For 17 years, he served as coordinator for the New England Gas Association School at WPI, and he's been a consultant for Commonwealth Gas for 24 years.

His profession combined with decades of outdoor life have made Wagner an expert on the dangers of camping equipment, especially lightweight stoves, which he has tested extensively. *Back Packer* magazine has published two articles about camp stoves written by Wagner and former WPI colleague Joseph Kohler.

"The main danger is the lethal level of carbon monoxide given off by backpacking stoves in normal use," he explains. "And cooking inside a closed tent only exacerbates the problem. Cooking should always be done in a level, safe, well-ventilated area." Some other Wagner hints for safe stove use: "Test the stove at home following manufacturer's directions; don't overfill or overprime; use correct fuel and right-size pots; turn the stove off if it's not working properly; and, above all, keep cool! If something goes wrong, think before you act!"

In the beginning, Wagner was not a booster of the WPI Plan. "But my black hat is gradually turning to gray," he confides, flashing his quick smile. "For certain math and engineering courses, I'm against the seven-week term. In a survey we've discovered that 90 percent of students feel the same way."

According to Wagner, students currently have too much freedom in course selection. For example, only 33 sophomores out of 73 took organic lab this year, the excuse being that it is too time-consuming. "There are some subjects that should be required."

He feels that grading under the Plan is another problem. In order to graduate with high distinction, a student must receive an AD (acceptable with distinction) on both qualifying projects, the sufficiency, and on the competency examination. To graduate with distinction, the student must get AD's on three of the four degree requirements.

"Note the inequity," he comments. "It's possible for a student to graduate with honors without having ever received a single distinction (AD) in any of his regular courses over a four-year period. Is this fair to the consistently outstanding student who has earned a majority of distinctions in his regular courses over the years, but who has an off-day on his competency?"

The students, Wagner believes, quickly realize the heavily weighted importance of the projects and the competency and tend to gravitate toward professors who are easy graders in these areas. "I also have difficulty equating the final selection of those who graduate with distinction with those who were chosen earlier on the basis of their regular class work into honor societies such as Tau Beta Pi," he continues. He opens a couple of folders. "Look at the records of these two former students," he says. "Both graduated with distinction." One record is notable for its parade of AD's and lone AC (acceptable). The other is notable for its single AD, lost in a sea of AC's. "Now," he says, "in spite of the 'distinction' which appears on each diploma, which graduate do you think a prospective employer would prefer to hire?"

When it comes to projects, however, Wagner jumps on the Plan bandwagon. "Projects are the best part of the Plan," he enthuses. "They are interesting and generally fun. The motivated students make them very worthwhile." This year he advised 30 students with their projects. "This means that I have to carry a lot of things home, but I truly enjoy the work, as well as my association with the kids."

A member of Skull and the ACS, Wagner has been commended for "his 26 years of outstanding leadership and devotion as advisor for the AIChE student chapter at WPI. Another certificate on his wall recognizes him as "WPI Teacher of the Year—1972." The teaching award is not surprising. Bob Wagner has always had an open-door policy in regard to his teaching and advisory duties. In class, he takes the time to explain difficult theories thoroughly, and to answer any lingering questions. His office door is never closed. In his busy schedule, he makes time for students and colleagues alike.

There is little doubt about how Bob Wagner feels about his "kids." He speaks of them with affection and teaches them with dedication. In a nutshell, 'Daddy Wags' loves teaching. "I couldn't have picked a nicer, happier way of life."

Chet Inman: Not afraid to talk up!

Chester Inman, '14, who admits that he's "going on 89," lectures to student nurses and medical personnel in Worcester area hospitals.

Is it so remarkable that a person of those years is still on the lecture circuit? Is it surprising that a man of his age should look so young? Well, what makes this almost unbelievable is that this octogenarian has spent a good part of his life talking without benefit of a voice box!

Back in 1940, cancer attacked Inman's vocal cords, necessitating the removal of both his vocal cords and larynx. The operation saved his life, but his voice might have been silenced forever. During his recuperation, Inman decided that he wanted to communicate more directly than with the note-writing that he had to endure. He was determined to speak, somehow. He drew strength from his family philosophy, "Know what you're up against and never give up."

Inman reports that his operation and recuperative period took several weeks. His diseased vocal cords and voice box were removed and a small opening was left in the throat where air is drawn into the lungs. A special bib was used to cover the opening (stoma) to prevent dust or water from entering.

Following the operation, he used a mechanical aid, called a reed larynx, in order to speak. The gadget could be fitted into his mouth and throat whenever he needed to say something. It had a reed that vibrated, making a noise, and his lips and mouth would form words. Of this device, Inman says: "It was awkward and conspicuous, of course, but worst of all, it would get stuck every once in a while and fail me right in the middle of a sentence."

Being an engineer, Inman set out to improve his gadget. It took him a year to design a base plate that wouldn't lock. After that, he got along all right. Whenever he wanted to talk, he'd whip out the aid, plug it in at his throat, and have his say. It was a nuisance, but it worked.

For ten years, he used his mechanical aid, telling himself that he was too busy to learn to talk without it. Finally, just before a trip to Bermuda, and with the encouragement of his wife and friends, he decided to look into a method called "esophageal speech."

He began learning this nonmechanical method of speaking by taking lessons with the late Mrs. Mary Doehler at the Massachusetts Eye and Ear Infirmary in Boston. A speech and reading teacher who underwent a larynx operation, Mrs. Doehler taught herself to speak again, perfected the method, and produced nationwide guidelines for speech therapists. Her program still continues in Boston.

Learning to speak again was very frustrating for Inman. Persistence and practice were the bywords. Although esophageal speech is probably the most natural method available to one without a larynx, it is also the most difficult to learn. It involves inhaling air into the esophagus and then emitting it in what Inman describes as "burps." The walls of the upper esophagus vibrate, creating sounds which can, with much practice, be formed into words and phrases.

"A speech therapist is usually necessary," he says. "And a laryngectomee can more successfully teach another laryngectomee, because he's been through it." Inman, a widower, used to practice his speech behind closed doors trying to say "Baaa" or "Mary had a little lamb."

His present speech is strong, rather than husky, and easily understood. If you listen closely, you can hear the sigh of his breathing in the background.

The new method of speech inspired Inman to do things that he would never have done otherwise, such as helping others in the same boat. "One of the best things that ever happened to me." Talking and lecturing, Inman is representative of many laryngectomees who make up the Worcester Nu Voice Club, to

which he belongs. These extraordinary men and women help and support each other, or anyone like them, who needs friendship and help. They are members of an exclusive group—persons, who because of cancer or accident, have had their voice boxes removed.

In his personal desire to help, Inman has made a part-time career of his retirement speaking to medical personnel. He's talked to more than 1,000 student nurses, and to groups of over 100 persons, for up to two hours at a time. He says, "people even 30 feet away understand me, with no microphones."

Since completing a series of four lectures for student nurses at Hahnemann Hospital, he is cutting down on road trips. However, he continues to help individuals faced with the same difficulties he has encountered. He and other members of the Worcester Nu Voice Club offer the human, personal touch as medicine for the emotional trauma suffered by laryngectomees. "We've been there. We understand."

Today, Chet Inman counts his blessings, which include four children, nine grandchildren, and seventeen great-grandchildren. And he can look back on a lifetime of accomplishment that few can match.

Professionally, he served as a partner in Pratt & Inman, Worcester, from 1923 to 1946, having joined the firm in 1917. A mechanical engineer, he instituted the first theoretical metallurgical course at WPI, where he was an instructor in 1921–22.

The 1922 *Aftermath* said of Inman: "He knows the ins and outs of the heat treatment game from his outside experiences in connection with steel, and is well able to make his course interesting."

His connection with WPI did not end in the classroom. His uncle, Edward Moore (deceased), graduated from WPI in 1911; his son-in-law, Frederick Swan, Jr., in 1935; his son-in-law, Prof. Owen Kennedy, Jr. in 1945; and his son, Chester Inman, Jr. in 1952.

In 1974, he received the Herbert F. Taylor Award for distinguished alumni service from the WPI Alumni Association. His citation reads in part: "You have worked for the good of your College as a concerned critic, as an officer (president) of the Worcester County Chapter and as a delegate to the Alumni Council. For almost a quarter of a century, you managed the investment program of the Worcester County Chapter which has resulted in scholarships for numerous Worcester County students. Your concern for improving the investment return of Association funds has been constant and consistent. The investment policy of the Association is the result of your dedicated labors. For all this, we proudly and gratefully honor and salute you."

Inman, along with Herb Taylor, '12, and Alfred Rankin, '04, helped establish the Alumni Fund, inaugurated in 1924. Also, he worked tirelessly for the Investment Committee of the Alumni Association since its inception in 1973 through 1976.

In 1919, he assisted in the founding of the Worcester chapter of the American Society for Metals (ASM), of which he is a charter member. For 35 consecutive years, he served on the chapter executive committee. In 1945, he was named chairman emeritus of the Worcester chapter, and in 1979, he received his 60-year membership plaque.

He was elected a fellow in the ASM in 1970, being one of the first 200 elected as fellows out of a what was then a nationwide membership of 45,000. The ASM cited him as "a pioneer in educational and technical society activities and in the management of metallurgical business."

Civic-minded, Inman has been busy with Kiwanis and church work, as well as with his most important "retirement" duties as a speaker and teacher in the cause of the laryngectomee. For many years, he has been active with the Cancer Society, living proof that cancer can be conquered. He has taken his message of hope to numerous public forums.

Through all the difficult times, he has followed the philosophy of his grandfather whose last words were: "This is the way of life. Do not go into mourning. Continue on as usual."

Chet Inman, although visited by adversity, has continued on as usual. He doesn't know how to give up.

For 50 years he has kept the following oath and prayer of Maimonides in his desk drawer and refers to it often: "Grant me the opportunity always to correct what I have acquired, always to extend its domain, for knowledge is immense and man can enrich himself daily with new requirements. Today he can discover his errors of yesterday and tomorrow he may obtain a new light on what he thinks himself sure of today."

REUNION 1981

1926's 55th Reunion

The Class of 1926 observed its 55th reunion on June 5th and 6th with festivities held on the campus. On Friday evening, dinner was served in the dining room of the Wedge in Morgan Hall with 19 classmates, 17 wives, and one guest in attendance. A social hour preceded the dinner, which featured roast beef or swordfish as entrees.

Following the meal, President Harold A. Baines conducted a brief business session when new officers were elected to serve for the next five years. They are: James A. Robertson, president; Archie J. Horne, vice president; and Raymond H. Bjork, secretary. Emerson A. Wiggin was the nominating committee chairman.

Harold and others brought us news about members of the class with whom they had personal contacts. We were saddened to learn of the loss of 29 classmates since our 50th reunion in 1976. Get well cards were signed to be sent to Phillip Delphos and Howard Thomson, who had planned to come but couldn't because of illness.

Archie was chairman of the reunion committee composed of Worcester alumni. On Saturday, we joined with other alumni for various events scheduled during the morning before the campus parade, followed by luncheon in the Harrington Auditorium.

Present on Friday night were: Doris and Harold Baines; Christine and Raymond Bjork; Sally and Donald Hager; Phyllis and Charles Hardy; Elsa and Fred Hedin; Marion and Archie Horne; Chandler Jones; Jane and Harold Kallander; and Marion and Carleton Maylott, and his sister, Alice Terrill.

Also, Helen and Charles Moran; Alice and John Morse; Beatrice and Linwood Page; Betty and Armand Paquette; Miriam and Arthur Parsons; and Ethel and Lawrence Peterson. Also, Helen and James Robertson; Thelma and Francis Snow; Mabbott Steele; and Beatrice and Emerson Wiggin. On Saturday, Doris and Carl Borrner joined the group.

—Raymond H. Bjork, Secretary

1931's 50th Reunion

The 50th Reunion of the Class of 1931 provided a wonderful three days for the 41 class members and 31 wives (and lady friends) who attended. It was a real fun time, as the years were forgotten and we became "kids" on the Hill again. The Sheraton-Lincoln provided excellent facilities for reunion headquarters and for the class banquet on Friday evening, June 5th. The hospitality room there seemed as a great mixer.

We are most grateful to President and Mrs. Cranch for their part in making the reunion a great success. The reception at their home on Thursday evening and the welcome dinner party that evening at the Higgins House will long be remembered. President Cranch awarded fifty-year diplomas after the dinner. These will be cherished for our lifetims along with our 1931 diplomas.

We are deeply indebted to Ted Coe and his lady, Mary Jane, for the striking and unique uniforms each of us wore from morning to night for the three days. Hopefully, our maroon and gray pork pie hats will become traditional at Tech.

Ted also was master of ceremonies for the banquet. All kinds of prizes were awarded, several of which ended in ties. One of the knots between Cliff Berquist and Phil Pierce (both of whom drove from California) was broken when sharp Phil announced he lived on the east side of the street.

Ed Odlum (with the help of his Mary) put together a superb fiftieth anniversary booklet which records class details over the years, with pictures of many of our reunions and reminders of our days on the Hill.

We enjoyed greatly the general reunion parade on Saturday. We only wish that the gypsy moth caterpillars had not driven the luncheon from the Higgins House lawn for then the parade would have been longer. Harrington Auditorium provided an excellent substitute location, however. The spectators appeared to enjoy our maroon and gray uniforms. We discerned their surprise, however, at the levity and youthful spirit of our group.

Bob Barrett, long term chairman of the 50-year gift committee, made the presentation at the general reunion luncheon on Saturday. When the gift committee was originally organized at our 35th reunion in 1966, the motto was $31,000 for '31. As we approached our 50th, and considering the amounts pledged, our motto was changed to $31,000 and $50,000 for '31 in '81. We

not only reached this new goal, but Bob announced that the class gift amounted to $192,000. This amount was realized through contributions from many of our class members and through the generosity and love for our alma mater of one of our recently deceased class members and the widows of other well-remembered active members of the class.

We were saddened when we learned through our telethon of May 3rd, that several of our classmates could not attend the reunion because of their incapacities or the illnesses of their wives. Our thoughts and best wishes were with all of them during the reunion.

Those attending were:

Mr. Idof Anderson, Jr. (Idof)
Mr. Frank H. Andrews* and Mary Faith
Mr. and Mrs. Robert E. Barrett* (Bob/Noriene)
Mr. and Mrs. Edward J. Bayon* (Ed/Ruth)
Mr. Clifford A. Berquist (Cliff)
Mr. and Mrs. Benjamin R. Chadwick (Ben/Marion)
Mr. and Mrs. F. Dudley Chaffee (Dud/Jean)
Mr. Joseph D. Chelauski
Mr. Edward S. Coe, Jr.* (Ted/Mary Jane Buttles)
Mr. and Mrs. Everett D. Collins (Everett/Arline)
Mr. and Mrs. Albert M. Demont* (Al/Phyllis)
Mr. and Mrs. John F. Devaney (John/Kathryn)
Mr. and Mrs. Warren N. Doubleday (Bun/Sigrid)
Mr. and Mrs. Frederick A. Farrar* (Fred/Lillian)
Mr. and Mrs. John E. Fletcher (John/Arlene)
Mr. Milton D. Gleason (Dex)
Mr. and Mrs. A. Wallace Gove (Wally/Mary)
Mr. and Mrs. Raymond H. Guenther (Ray/Hilda)
Mr. and Mrs. Edwin V. Haskell (Ed/Barbara)
Mr. John H. Hinchliffe, Jr. (John)
Mr. Ralph Hodkinson (Ralph)
Mr. and Mrs. Everett E. Johnson (Everett/Betty)
Mr. and Mrs. Charles A. Kennedy (Charlie/Marion)
Mr. Trescott B. Larchar (Tres)
Mr. and Mrs. Otis E. Mace (Otie/Eleanor)
Mr. and Mrs. Gustav E. Mangsen (Gus/Bernice)
Mr. Richard G. Marden (Dick)
Mr. and Mrs. Roger W. Mills (Roger/Marian)
Mr. and Mrs. Edward J. Odlum* (Ed/Mary)
Mr. and Mrs. J. Philip Pierce (Phil/Irma)
Mr. and Mrs. Carl E. Rylander (Carl/Mary)
Mr. and Mrs. Carl F. Sage (Carl/Valerie)
Mr. and Mrs. George W. Smith (George/Evelyn)
Mr. Michael C. Sodano (Mike)
Mr. and Mrs. Hurant Tashjian (Hurant/Diane)
Mr. and Mrs. Robert D. Taylor* (Bob/Marion)
Mr. A. Francis Townsend* (Fran)
Mr. and Mrs. Oliver R. Underhill, Jr.* (Red/Patricia)
Mr. and Mrs. Charles B. Walker (Charlie/Lucille)
Mr. and Mrs. Robert S. Williamson (Bob/Ormell)
Mr. and Mrs. Charles E. Woodward (Chick/Elizabeth)
Mr. Trueman L. Sanderson (Sandy)

Although John Tuthill and Russ Libbey had planned on being with us, illnesses prevented their attendance.

It was a great reunion. We are looking forward to our next.

—Ed Bayon, Class Secretary
Reunion Committee Chairman

Counterclockwise, beginning at the bottom of this page: Highlights of Reunion, featuring the Grand Reunion Parade of the classes around the WPI quadrangle to the Reunion Luncheon in Harrington Auditorium. The original route would have ended up on the lawn of Higgins House, but we were driven indoors this year by the gypsy moth caterpillars. The parade was led by the pipes and drums of the Springfield Kilty Band and by (what else?) a goat wearing the WPI banner and colors! (Goat and goat-handlers courtesy of Prof. James Demetry.)

API

W.P.I.
1941

1941's 40th Reunion

ALL 70 CLASS MEMBERS who attended made our 40th a wonderful success. No distance of place or lapse of time lessened the friendships renewed back at Tech. Many traveled far. The happy faces shown in our class picture attest to the fun that we had over the gala three days in early June. Some of the early arrivals (Bud & Irene Boyd, Texas; Bill & Shirley Simmons, California; Bud & Nita Roberton, Spokane, Washington; and Stan and Peggy Majka, California) enjoyed a bit of New England again prior to reunion time.

Some 35 classmates, most with their wives, enlivened two dinner banquets, dancing, receptions, luncheons, parades, and hospitality-suite time that carried into the wee hours of the morning following afternoon and late evening gatherings, as time permitted. Time flew much too fast, for there was much to do and more to talk about.

41'ers really performed, parading with colorful umbrellas and handy ladies' tote bags behind a Kilty band and live goats to the all-alumni reunion luncheon, where a record turnout of more than 700 WPI alumni, with their families and friends, gathered for the celebration and festivities. The Class of 41's contribution to the College was $100,000, presented most warmly by Jim McGinnis, who worked hard along with others to ensure it. We were proud of our own Len White, who received the Herbert F. Taylor Award for Outstanding Service to WPI.

Our '41 paraphernalia, favors, prizes, gifts, and more were well received. Anne Bellos and Peggy Majka won prizes at golf competing with wives from other classes. Husbands Al Bellos and Stan Majka should have won, judging from the scores we heard they had.

Marianne and Prof. Charlie McNulty were our guests. He brought the class up-to-date at our banquet, speaking primarily of activities in sports and changes brought about with female sports on campus.

Everyone's participation throughout the entire weekend was something special, and it appeared that everyone had a real good time. The many who were unable to attend were sorely missed, and yet we had the time to pass along all the messages and best wishes received by telegram, letter, and phone calls from the numerous friends we heard from. What a memorable weekend you unfortunately missed! Your chance will come again, though. Another five years or ten and we expect to see *everyone* there.

We owe thanks to Bill Bowne of Schenectady, N.Y., for the 200 feet of 8mm movies taken during undergraduate years on campus and shown several times during reunion.

We thought of those no longer with us. The list is far too long.

Your committee is grateful to all of the following who made such a fine effort to attend, making our 40th the great weekend it was. Space does not permit our mentioning the most interesting bits of information we would like to include about each and every one of you. It was great to see so many friends enjoy so much over so short but so eventful a weekend, and we do hope you all keep in touch.

—F. Douglas McKeown

1941 Attendees:

Andy Anderson, Worcester
Al & Anne Bellos, Glens Falls, N.Y.
Bud & Irene Boyd, Corpus Christi, Texas
Jake & Dorothy Boyle, Shawnee Mission, Kansas
Irv & Ruth Breger, Silver Spring, Maryland
Alex Davidson, Fair Haven, N.J.
Ray & Marie Delisle, Lunenberg, Mass.
Ken & Barbara Dresser, Burlington, Vt.
Lloyd & Marcia Greenwood, Sun City West, Arizona
Gordon & Claire Gurney, Holden, Mass.
John & Ann Haran, Needham, Mass.
Les & Pat Harding, Atlanta, Georgia
Harold & Ruth Holland; New London, N.H.
Vic & Vickie Kolesh, Holden, Mass.
Mac and Peg MacLeod, Centerville, Mass.
Stan & Peggy Majka, Walnut Creek, California
Jim & Ruth McGinnis, Cohasset, Mass.
Cout & Ros McKeown, Worcester
Hank & Eileen Medwin, Pebble Beach, California
Henry Palley, Worcester
George & Cleo Peck, Needham, Mass.
Rich & Eleanor Ramsdell, Culver City, California
Bud & Nita Roberton, Spokane, Washington
Ed & Jane Ryan, Alexandria, Virginia
Fred & Harriet Sherwin, Hampton, N.H.
Bill & Shirley Simmons, San Rafael, California
Chas (cosine) & Mary Smith, Omaha, Nebraska
Sid & Rhoda Soloway, Norwalk, Conn.
Len & Ann White, Worcester
Bill & Esther Wiley, Waltham, Mass.
Bob & Jeanne Wilson, Longmeadow, Mass.
John & Pauline Wolkonowicz, Worcester
Paul Carullo, Torrington, Conn.

Your Committee:
Andy Anderson
Ray Delisle
Vic Kolesh
Len White
John Wolkonowicz
and Doug McKeown, chairman.

Honors and Awards at Reunion
At right: Walter J. Bank, '46, receives the Herbert F. Taylor Award for service to WPI.
Below: Len White, '41, shown with Carl Backstrom, '30, chairman of the Citations Committee, receives his Taylor Award.
At right: Paul S. Morgan, chairman of the Board of Trustees, presents the Robert H. Goddard Award for professional achievement to John Metzger, '40, and Harold S. Black, '21, as WPI President Edmund T. Cranch looks on.
At right, below: Edwin B. Coghlin, Jr., '56, and Harry W. Tenney, Jr., 56, accept their Taylor Awards with characteristic enthusiasm.

At left: Incoming Alumni Association President Peter H. Horstmann, '55, is welcomed to office and congratulated by his predecessor, John H. McCabe, '68.

1956's 25th Reunion

THE TRUE SUCCESS of the weekend belongs to each classmate who made that little extra effort to participate. For the first time in WPI Reunion History, the 25th Reunion Class earned the prized Attendance Cup, for the largest percentage of members attending. To the Committee, to the Alumni Office, to the Class Officers, to the great Class of 1956, hearty congratulations.

The festivities began with Dave and Jill Pratt and Bob and Norma Allen teeing off late Friday morning at Worcester Country Club. The festivities ended with many classmates reluctant to depart Sunday morning, as Joe Wahl and Dick McBride completed their challenge tennis match under the cloudless skies which made the weekend weather perfect for our occasion. In between the sporting events, friendships were renewed, actions good and bad were recalled, and the Class Yearbook thoroughly perused. Some of us have changed, and yet others were instantly recognizable as we walked through the doors of the Hospitality Suite or into Morgan Hall's registration area.

Arnold Hall, our tennis captain, said he had not had a tennis racket in his hand for sometime but he certainly managed to exhibit his old form as he led the tennis players onto the court. Hank Nowick's Chowder hour was an outstanding success. For over eight months the Planning Committee had kidded Hank about his chowder hour, but Hank turned the tables on us by serving very delicious chowder along with cocktails and snacks at the Hospitality Suite. The Hospitality Suite in the Fuller Residence was so crowded, in fact, that we spilled out onto Schussler Road and the surrounding porches and terraces. The accommodations for our class were excellent. Many continued visiting into the wee hours after a delicious clambake, including clams, lobster, corn on the cob, and all the fixings.

The entertainment, after dinner and in the Sanford Riley Pub, was provided by the Ragtime Rowdies, a banjo band. At various times, classmates with a musical flare went up to the bandstand and participated. Memories of fraternity parties and class events, where our talented musicians made great music, returned as they played.

Saturday morning some slept in, while others were up bright and early to return to the Hospitality Suite, to do some more visiting, or to tour the campus and learn all about the WPI plan. The Reunion Luncheon was very well attended. Highlights of the luncheon came in two parts, the first as WPI recognized, with the Herbert Taylor Award for service to the College and the Association, Harry Tenney and Ted Coghlin, and then when Jack McHugh and Ted Coghlin were called to the stage to accept from Steve Hebert the WPI Class of 1917 silver loving cup, including champagne, for the greatest degree of reunion attendance—46 percent.

President and Mrs. Cranch hosted 1956 at a cocktail reception in the president's home on Saturday evening. We then attended the Class Dinner Dance at Worcester Country Club, on the terrace under the tent. Bernie Danti, the class officers, Hank Nowick, Jack McHugh, Paul Schoonmaker and Jerry Dyer along with the other committee members, really made the Dinner Dance outstanding. The meal was superb, the speeches short, the prizes and recognitions to classmates very appropriate. Everyone there had a great time.

The goat's head spent the weekend with the class. Saturday night it disappeared. Thanks to some good detective work, Jack McHugh thinks that he knows where the goat's head went. You might be interested to know that after the Class of 56 took part in goat's head competition, the goat's head was eliminated from campus life. A tradition started by the Class of 93 was finished during the Class of 56's years at WPI. It has been suggested that maybe a tradition missing for 25 years should be revived.

The 25th Yearbook, given to all classmates who came, will be mailed to everyone who was unable to make the reunion. As you look through the yearbook, you get to know your classmates and their families just a little better. To those who did not forward profiles, we certainly would welcome hearing from you. The Reunion Committee and class officers were voted to continue in office. Maybe the attendance cup should be retired by the Class of 1956, by continuing to have outstanding attendance at future Reunions.

This reunion did not just happen. Many people devoted hours of time and energy to make it a success. The Hospitality Committee, chaired by Marcia Tenney, was given great assistance by Bob and Jean Farrar, Jim and Dot Prifti, Win and Dotty Spofford, Roger Tancrell, and the 25 classmates and spouses who acted as hosts and hostesses during various times that the Hospitality Suite was open. The special Class Gifts Committee was ably chaired by George Strom.

The class gift was outstanding. The leadership in giving provided by Bob and Janet Foisie and all of the other contributors meant that nearly 70 percent of the class took part in making a gift of over $87,000. The money will be used to help WPI remain in the forefront of technology, by providing space, facilities, and renovations to the Computervision CAD/CAM Laboratories which will be located in Higgins. The Computervision firm gave $300,000 of equipment, which will be greatly enhanced by the use of our class gift to provide the peripheral equipment and facilities which will enable students to properly and effectively use the equipment.

Sunday morning, tired, weary yet sparkling faces greeted one another as we departed for home. Many classmates who had only planned on coming for a short time stayed through Saturday evening, and the Worcester area classmates were very much in evidence Sunday morning at the brunch, to say their last goodbyes.

We had a super weekend. The comments about the activities were all excellent. Next reunion we will plan an extra day, in order that those who can get away early will have just that much more time to enjoy being with their classmates.

A list of all who attended the reunion is appended to this report. Some of our classmates unfortunately are missing. If any one knows the whereabouts off the missing classmates, Steve Hebert or the Committee would greatly appreciate hearing. Three of our classmates—Seth Ballard, Tony Churbuck, and Les Keffe—have passed away. Use the updated directory of classmate addresses and information to keep in contact. We hope to see even better attendance at our next reunion. Meanwhile, to you and your family, from all at WPI, best wishes for a great decade of the 1980's.

—Ted Coghlin

1956 25th Reunion Attendance

Mr. & Mrs. Alan M. Adamson
Mr. Raymond K. Agar
Mr. & Mrs. Robert S. Allen
Mr. & Mrs. Christian S. Baehrecke
Mr. Richard N. Bazinet
Mr. & Mrs. David S. Becker
Mr. Philip P. Bedard
Mr. & Mrs. Ernest Bernstein
Mr. Edward A. Blakeslee
Dr. & Mrs. Howard H. Brown
Mr. & Mrs. Edwin B. Coghlin, Jr.
Mr. & Mrs. Christopher R. Collins
Mr. & Mrs. Joseph J. Concordia
Mr. & Mrs. Bernard R. Danti
Mr. & Mrs. Henry J. Dumas, Jr.
Mr. & Mrs. Gerald T. Dyer
Mr. & Mrs. Robert H. Farrar
Mr. & Mrs. Robert A Foisie
Mr. James W. Green
Mr. & Mrs. Michael G. Gordon
Mr. & Mrs. Charles E. Gunn
Dr. & Mrs. Raymond R. Hagglund
Mr. & Mrs. Richard G. Hajec
Mr. & Mrs. Arnold M. Hall
Mr. Allan C. Hamilton, Jr.
Mr. & Mrs. Thomas W. Hansen
Mr. & Mrs. Charles R. Healy
Mr. & Mrs. Robert R. Heath
Mr. & Mrs. Lawrence B. Horrigan, Jr.
Mr. & Mrs. William A. Johnson
Mr. & Mrs. James C. Kubik
Mr. & Mrs. Alan G. Larsson
Mr. & Mrs. Fred H. Lohrey
Mr. & Mrs. Vilho A. Lucander
Mr. & Mrs. Raymond J. Lussier
Mr. & Mrs. Robert W. Matchett
Mr. Richard J. McBride
Mr. & Mrs. John M. McHugh
Mr. & Mrs. Henry W. Nowick
Mr. & Mrs. Joseph F. Paparella
Mr. & Mrs. Bruce F. Paul
Mr. William P. Peterson
Mr. & Mrs. Halbert E. Pierce III
Mr. & Mrs. David A. Pratt
Mr. & Mrs. James K. Prifti
Mr. Robert Robinson
Mr. & Mrs. John H. Rogers, Jr.
Mr. & Mrs. Richard L. Rotelli
Rev. & Mrs. Paul D. Schoonmaker
Mr. Roy A. Seaberg, Jr.
Mr. & Mrs. Harold F. Smith
Mr. & Mrs. Winslow M. Spofford
Mr. & Mrs. Peter J. Stephens
Mr. & Mrs. George P. Strom
Mr. & Mrs. Charles A. Sullivan, Jr.
Dr. Roger H. Tancrell
Mr. & Mrs. Harry W. Tenney, Jr.
Mr. & Mrs. William C. Van Keuren
Mr. & Mrs. Joseph G. Wahl
Mr. Edward R. Wiot

1903

Henry Potter of West Dennis, Mass. celebrated his 100th birthday on Feb. 22, 1981. He was honored by seventeen friends and relatives at a party held at his daughter's home. Mr. Potter retired in 1949 following 35 years with the Hartford Insurance Group. In 1938, he served as master of Washington Lodge No. 70 in Windsor, Conn. He has two sons, a daughter, seven grandchildren, and three great-grandchildren.

1912

F. Holman Waring suffered a stroke early in January after shoveling snow. His speech, right arm, hand, and leg were affected, but he is now able to get around using a walker.

1915

Correction: In the spring issue, the late Prof. **Carleton Haigis** was inadvertently referred to as Prof. "Haig."

1916

Robert Lamb was the only member of the class to attend the dual funeral service for **Harold Nutt** and his wife last fall.

1930

A few classmates returned for our 51st and we had a good time. Hope we'll see more next year (June 5).

Bill Davidson is spending the summer of '81 in Alaska. . . . . **Ed Delano** says he is getting in shape for the Social Security set's non-stop cross country cycling relay scheduled for June. **Bob Hollick** writes from Cambridge, England: "Here I'm continuing my education and seeing cousins and other relatives for the first time. It's been a great trip and I'll return directly to San Francisco."

George Marston says: "Now it's time for our 51st reunion. Never had time to feel old at our 50th, especially after talking with Ed Delano." . . . . **Jim McLoughlin** hopes to make one of our reunions. (Let's plan on the 55th, Jim.) . . . . **Ed Milde** reports he "enjoyed the 50th," and probably would have attended the 51st if he lived nearer WPI. . . . . **Dan O'Grady**'s son, Dan, Jr., is a member of the Class of 1961, which celebrated its 20th reunion this year.

Fred Peters writes that his wife passed away on April 21st. . . . . **Pete Topelian** had a hip replacement in February. "Still working at Boeing and enjoying every minute of it."

The following wanted to come back, but couldn't make it: **Ralph Gilbert**, **Norm Butterfield**, **John Conley**, **Christ Orphanides**, **Bill Locke**, **Paul Reynolds**, **Carm Greco**, **Stan Fillion**, **Henry Pearson**, **John Wells**, and **Ray Lewis**.

—Carl Backstrom, Class Secretary

REUNION: JUNE 3-6, 1982

1932

George Barks writes from Oceanside, Calif. that he has retired twice, "but will start something again." He and Barbara were married in April of 1980.

1934

Carl Hammarstrom was recently elected as a director of the National Society of Professional Surveyors, a part of the American Congress on Surveying and Mapping.

George Kalista just returned from seven weeks in Florida. He is retired from his old position after 37 years.

1935

Richard Merriam has retired as controller of the Plant Engineering Division at the Stanley Works, New Britain, Conn. . . . . **Harvey White** has been a property risk manager for Risk Consultants, Inc. since last November

1938

Currently, **Theodore Andreopoulos** is a consultant on aeronautical structures for the New Japan Aircraft Co., Ltd., Tokyo, Japan. "A new career step."

Robert Day retired as chief project engineer at Industrial Risk Insurers on April 29th following more than 42 years of service with the company. He started at IRI in 1938 after graduating from WPI as an electrical engineer. During his career, he was a resident engineer in Albany, N.Y. and Allentown, Pa.; chief engineer of the eastern regional office in the 1960s; and a member of the IRI national staff since 1976. Headquartered in Hartford, Conn., IRI is a leading international underwriter of commercial property insurance.

Arnet Powell recently returned from a business and pleasure trip to Japan and Australia. "It added up to a trip around the world with other major stops in Hong Kong, Greece, and Egypt."

1939

Donald Houser has retired from USM Corp. . . . . **John Peavey** retired in February after 35 years as a process engineer with John H. Breck/Shulton, a division of American Cyanamid in West Springfield. In March, he moved into a new seven-room brick ranch on a mountainside in Hendersonville, N.C. The basement is big enough for him to set up power tools in a woodworking shop. He writes: "Hendersonville is a very active community. Good climate. 2000 feet above sea level." Peavey is a retired lieutenant colonel in the USAR.

1940

Howard Freeman, president and board chairman of the Jamesbury Corp., was awarded an honorary degree by Central New England College, Worcester, at commencement exercises in June.

Edward Goodrich writes that he plans to retire at the end of the year. . . . . **Bob Higgs** is now manager of contract services at Joy Manufacturing Company, Pittsburgh, Pa.

Presently, **Benedict Kaveckas** serves as a fixture design engineer for printed circuit board automatic component insertion equipment at Wang Labs, Tewksbury, Mass.

Norman La Liberte retired last July after 33 years with the American Optical Co., where he was a senior research chemist. "I have been enjoying the lazy life ever since in Woodstock, Conn." At AO, he was actively involved in the development of the plastic lens that is common and useful today. In retirement, he is a tennis buff and likes playing at home as well as during winter vacations in Florida. He and his wife have three daughters and four grandsons.

Chapin Cutler receives IEEE Edison Medal

The accomplishments of Thomas Alva Edison inspired the creation of the Edison Medal, which has been awarded this year by the Institute of Electrical and Electronics Engineers to C. Chapin Cutler, '37.

The Edison Medal has a distinguished heritage, the first one created in 1904 to commemorate 25 years of electric lighting following the invention of the electric light bulb by Thomas Edison. According to the founders of the award, "The Edison Medal . . . . should serve as an honorable incentive to scientists, engineers, and artisans to maintain by their works the high standard of accomplishment set by the illustrious man whose name and feats shall live while human intelligence continues to inhabit the world."

Since 1909, 68 people have been selected by their contemporaries to receive this award, which consists of a small replica of the Edison Medal, a certificate, and $10,000, in addition to the medal itself.

This year, Chapin Cutler received the Edison Medal "in recognition of his creative contributions to microwave electronics, space communications, and technology of communication systems."

Except for two short academic sabbaticals, he was engaged in research at Bell Laboratories in New Jersey from 1937 until 1979. His research included contributions to short wave radio technology for overseas communication, microwave radar antennas, microwave amplifiers, satellite communication, digital signal coding, and the Picturephone©. He holds over 70 patents, including fundamental patents on differential pulse code modulation. In some circles, he is known as the inventor of the Cutler rear feed horn for parabolic antennas, a device that was used widely in both theaters of World War II.

Cutler is less well known as the inventor of the corrugated wave guide; corrugated antenna feed systems; and of a variety of multimode antenna feeds, because his work in these areas was not declassified by the U.S. government for many years. In his work, he received inspiration and guidance from his association with John Schelleng, who had contributed so much to the understanding of short wave radio propagation. He is particularly grateful to Professor Emeritus Hobart Newell of WPI for stimulating his interest in electronics and radio, both in the classroom and outside.

Following World War II, he worked on microwave amplifiers: first on circuits using close-spaced triodes; and then on traveling wave tubes. His close association with Rudolf Kompfner, who invented the traveling wave tube, and with John Pierce, who contributed strongly to the theory of its operation and who invented the Pierce electron gun, was an important factor in Cutler's success.

In 1957, with the advent of Sputnik, his interests turned to the possibilities of satellite radio relay systems. He shared in the management, design, and operation of Project Echo, the passive satellite experiment (1969) and of the Telstar active satellite (1962).

In 1952, he was named head of the Electronics Research Department at Bell Labs, where he was responsible for work on microwave electron tubes. Later, he was appointed assistant director of the Electronics and Radio Research Laborabory; then director of Electronics Systems Research; and finally, director of Electronic and Computer Systems Research. In 1979, he retired from Bell to become professor of applied physics at Stanford University.

His two sabbaticals were spent at the University of California at Berkeley (1957) and at Stanford (1975). He was associate editor of the *Transactions on Electron Devices* for many years, and editor of *IEEE Spectrum* for two years. In 1975, he received an honorary doctor of engineering degree from WPI. He is a fellow of the IEEE and was chairman of the Awards Board of the Institute in 1975-1976. He is a fellow of Sigma Xi, and a member of the National Academy of Engineering, and the National Academy of Sciences.

In spite of the demands of a busy career, Cutler has always found time to enjoy hiking and mountaineering. Other interests are canoeing, gardening, and skiing, and working with gadgets. He has held most of the local posts of responsibility in the Christian Science Church, and has served WPI as a class agent, and his community as a Boy Scout volunteer.

Presently, he and his wife, Virginia, reside in Palo Alto, Calif., home base for another of his pastimes, bicycling. This year he bicycled 100 miles on the Coast Highway, all the way from Carmel Valley to San Simeon!

"We are loving our new life in California," he reports, "although it is not really relaxing." But then, it should be obvious that Chapin Cutler prefers an active rather than a passive life, both inside and outside the laboratory.

1941

Dr. **George Cowan**, former associate director for chemistry, earth and life sciences, has been named a senior fellow at Los Alamos National Laboratory in New Mexico. In 1965, he was the recipient of an E. O. Lawrence Memorial Award for "meritorious contributions in the field of atomic energy." He is an authority on applying radiochemistry techniques to bomb debris for weapon diagnosis. Also, he was one of the pioneers in using nuclear explosives as a neutron source for scientific experiments, and he played a key role in the first atomic bomb project. In 1945, he joined the laboratory for one year and returned to stay in 1949, progressing from a staff member in the radiochemistry group to his current position. As a fellow, Cowan will be free to devote a large portion of his time to research topics of his choice. He will also be available to assist and advise others on selected research projects, thus allowing the scientific community to reap the benefits of his expertise. He holds a doctor of science degree in chemistry from the Carnegie Institute of Technology.

Graham Douglass holds the position of manager of electric utilities at Pinehurst, Inc., Pinehurst, N.C. He is a retired colonel in the Marines.

REUNION: JUNE 3-6, 1982

1942

John Bartlett has been named district sales manager for the New England area by Precision Kidd Steel Co. The former general manager of New England High Carbon Wire Corp., Millbury, Mass., he will now be in charge of the Pennsylvania company's sales of cold drawn and cold finished carbon, alloy and tool steels. He attended Becker Junior College and received a BSME degree from WPI.

1945

William Densmore was recently appointed as senior vice president of engineering and information systems at Norton Company, Worcester. For the past two years, he has been Norton's vice president for abrasive operations in the U.S. and Canada. In his new post, he will supervise the company's corporate engineering and construction services, manufacturing standards, computer systems and services, and purchasing and transportation. Also, he will support continuing improvements in productivity and efficiency in all aspects of Norton operations, and will become a member of Norton's Corporate Management Committee. A graduate of WPI's School of Industrial Management, he received the Albert J. Schwieger Award for outstanding achievement in 1976. He is a registered professional engineer in Massachusetts.

Densmore joined Norton in 1946 and held several industrial engineering positions before being named director of engineering and construction services in 1961. He was elected a Norton vice president and became general manager of its Industrial Ceramics Division in 1965 and general manager of the Grinding Wheel Division in 1971 before being named to his current position in 1979. A director of the Worcester Heritage Preservation Society, he has also been a member of the Massachusetts State Board of Education and a director of the Worcester Area Chamber of Commerce.

1946

Currently, **Richard Anschutz** holds the post of account executive with E.F. Hutton & Co. He is located in Tequesta, Fla. For many years he was with Pratt & Whitney Aircraft, East Hartford, Conn., where he rose to executive assistant to the division president. He serves as a trustee of Florida Institute of Technology, as a director of the Civic Opera of the Palm Beaches and of the Greater West Palm Beach Chamber of Commerce, and as a vice president of the National Defense Transportation Association. Formerly, he was vice mayor of Jupiter Inlet Colony in Florida.

Bob Appenzeller writes: "Beautiful wife, two beautiful kids, a beautiful mutt named "Chester", and a beautiful mortgage. Kids will be getting married this summer taking mutt, but leaving wife and mortgage." Bob is president of a 100-man company which engineers, designs, and manufactures special machinery and does business world wide. He enjoys his job, golf, fishing, and flying.

Ted Balaska's children are settling in Colorado and Utah, so he and "Bobbie" are looking for a western retirement site. During his career, he has been with Hartford Electric Co., Long Island Lighting, and Phelps Dodge. In 1971, he joined Bishop Electric, where he is now director of engineering services. He is very active with the IEEE, serving on several committees. Besides golf and swimming, travel takes up about 75 percent of his time.

Presently, **Walter Bank** is an alumni term trustee on the WPI Board of Trustees and national chairman of WPI Alumni Admissions. From 1973 to 1975, he was president of the Alumni Association. In January, he became director of marketing at DCS Corp., Arlington, Va., where he is concerned with R&D in electro-optical systems (infrared, lasers, etc.) Previously, he was with Systems Consultants, Inc., Control Data Corp., Trident Laboratories, and Sylvania Electric.

Surf fishing, woodworking, and gardening are **Bernard Beisecker**'s favorite hobbies. He serves as director of manufacturing for Industrial Fasteners on Long Island. Earlier, he had been with U.S. Steel, Booz Allen & Hamilton, and Central Screw. Last year, after nearly five years in Kentucky, the family moved back East.

For 21 years, **Cushing Bozenhard** continued in the construction business. In 1979, he sold the building in Worcester "for the good life of early retirement." Since his "retirement," he's become so involved in construction consulting that he's trying to figure out how to retire again. Two of his hobbies are especially unique: collecting rare books (which he rebinds in leather and cloth); and plans to take up bee-keeping. He still sails the same Pearson 35 out of Marion, Mass. "Have made five or six ocean trips, to and from Bermuda, Virgins to Bermuda, etc. A different kind of sailing and challenging to mind and body."

1948

In January, **Malcolm Gordon** retired from the Chemical Systems Lab., Aberdeen Proving Ground, Md. Presently, he is an independent technical consultant to several industrial companies which have contracts with various organizations on Aberdeen Proving Ground. Most of the work involves engineering analyses of the technical productivity and direction of R&D programs.

1950

George Barna was recently promoted to vice president of Government Simulation Systems at Singer-Link Co. He has responsibility for operations in Sunnyvale, Calif., Houston, Tex., and Binghamton, N.Y.

Francis Kearney has been transferred by Monsanto from plant manager of the Bircham Bend plant in Springfield, Mass. to director of environmental operations for Monsanto Plastics and Resins Co. in St. Louis, Mo. . . . . **Frank Pease** continues to work for Stauffer Chemical Company as manager of purchasing for the corporate engineering department in Dobbs Ferry, N.Y.

1951

Bruce Bailey writes that over the past twenty years he has logged about 70,000 miles bicycling, "much of it commuting between Milton and Cambridge." He also enjoys tennis and singing in the local Episcopal Church choir. Both he and his wife, Mary, are active in church work. One of his three sons, Brownell, received a degree in urban and regional planning from WPI in 1980 after re-

ceiving an AB in fine arts from Union College and teaching in France.

After two years at NASA's Langley Laboratory, Bailey spent six very interesting years working in cryogenics with Arthur D. Little, Inc., where he had the opportunity to co-author and present to the American Vacuum Society the first paper to have the term "cryopumping" in its title. ("We had used a helium refrigerator to freeze nitrogen at 20 degrees K in near-vacuum to drive a hypersonic wind tunnel requiring very little power.") In 1959-60, he was assistant to the director of research and development at Air Products & Chemicals developing in-house research programs for the company. In 1960, he joined the staff of the Laboratory for Nuclear Science (LNS) at MIT as chief mechanical engineer, and he's been there ever since. During that time, he was also a research fellow in mechanical engineering at Harvard; developed and taught the first graduate courses in cryogenic engineering at Northeastern University; managed the mechanical engineering for MIT-initiated projects at Stanford Linear Accelerator Center in Palo Alto, Argonne and Fermi National Accelerator Laboratories outside Chicago, Brookhaven National Laboratory on Long Island, N.Y., the European nuclear research laboratory (CERN) at Geneva, and the German Electron Synchrotron (DESY) in Hamburg, as well as MIT's linear accelerator laboratory in Middleton, Mass. The MIT experiment at Brookhaven from 1972 to 1975 won for its leader, Prof. S. C. C. Ting, the 1976 Nobel Prize in physics.

Throughout his first 18 years at LNS, Bailey enjoyed a deeply rewarding collaboration with **Cy Tourtellotte, '40**, who retired from MIT in 1978 after more than 30 years of leadership in the design-drafting area of the laboratory. In 1975, Bailey received his MSME from Northeastern.

Although he says that many of the WPI faculty are memorable to him, Prof. K. G. Merriam was the most memorable of all. He writes: "He truly inspired me to follow a career in engineering-research which turned out to be deeply satisfying."

Walter Dennen serves as manager of communications and information at RCA Naval Systems Information Department in Moorestown, N.J. . . . . **John George** has joined Bernard E. Lynch & Associates in Worcester. . . . . **Carl Johansson** says that he's back in Connecticut after six years in California and Chicago. His daughter, Greta, graduated from Stanford on Father's Day last year. Daughter Lisa has been married for two years. Presently, Johansson is doing pharmaceutical plant design with Crawford & Russell. He recalls that Bob Weiss, WPI's head football coach, "was my high school's football coach."

Vartkes Sohigian is now with Wang Laboratories in Lowell, Mass., where he is in corporate personnel administration. He continues to teach a course in WPI's evening program. . . . . **Bernard Ziobrowski** is an R&D chemist at Ciba-Geigy in Glens Falls, N.Y.

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1952

Donald Adams has been elected senior vice president of Allendale Insurance, Johnston, R.I. He joined the Factory Mutual System in 1952 as a loss prevention engineer. During his Allendale career, he advanced to hold a number of management positions, including vice president-manager of Canadian operations, group vice president of regional operations, and his most recent position of group vice president of administration. Allendale Insurance is an international organization specializing in loss control engineering and industrial property insurance.

Stanley Berman was recently named vice president for Asia and Pacific in Norton Company's Abrasives Group, Worcester. Formerly, he was vice president of abrasives manufacturing. The Abrasives Group has been restructured into four major operating units to strengthen worldwide coordination and planning.

Charles Reichert has had his own consulting business, Rikert Engineering Co., for three years. He writes: "I enjoy the varied work that I get involved with." The Reicherts have five children and three grandchildren.

1953

Formerly with NRL in Washington, D.C., **Willard Bascom**, who has a PHD from Catholic University, is now manager of composite research at Hercules, Inc. in Magna, Utah.

Dave Estey writes that he's still with GE in the Washington, D.C. area, but now serves as district sales manager, Washington-Data Communications.

In April, **Ray Giguere** became a grandfather for the first time, when his granddaughter was born.

Dave Hathaway sends word from Lexington, Mass. He completed 21 years in the Navy with some pleasant memories: Taipei, Norfolk, Va., and even L.A. Less pleasant memories are associated with Guantanamo Bay, Cuba, and Viet Nam. He's now a hospital engineer in charge of the physical plant of a 200-bed hospital. Son Stephen, 23, is finishing the Co-op program at Northeastern. Daughter Jeanne is a top student at UNH and is probably headed for medical school. Dave sounds like a very proud father. The Hathaways are a "gunkholing family—using Dark Harbor, Maine, as our home port" for excursions in their Mariner. More recently, they've had the boat out to Long Island and to Martha's Vineyard and from Kittery to the Isle of Shoals. Dave was headed for Worcester in June for a fairly unique event—a grand reunion of choirs over the past 30 to 40 years at the Baptist Church.

Dr. **Mike Hoechstetter** has been with Ashland Chemical in Columbus, Ohio since 1974. His two oldest children, Rick and Sharon, are in college, whole Lisa is in high school. Most of the family is actively involved in camping, skiing, and sailing. The family "yacht" is a 4.5 meter Super Porpoise. A typical camping/sailing outing involves towing the boat behind an Airstream trailer which is towed behind the Olds, to a lake on the Pennsylvania border. The rig is 17 meters from bumper to stern.

Bob Menard writes from Richmond, Va., that he is still with the corporate sales group of Nalco Chemical. His job is calling on the executive level of the paper industry—lots of travel and entertainment in which his wife, Betty, is involved much of the time. Both children attend VPI in Blacksburg. Mason is a junior in chemical engineering and daughter, Kelly, is a freshman in the business school. Both were ranked tennis players in Virginia before college, but studies have been more demanding, so they have played only intramural tennis at VPI. Bob and Betty, with the youngsters gone much of the time, have moved into a condominium in Richmond and have concluded that was a good decision. Their main hobby is also tennis, so "bring your racquet when you come through town."

Don Post is a good deal closer—in Auburn, Mass., although just back from a Hawaii vacation, "our favorite corner of the world!" Don is director of marketing for the Plastics Division of American Hoechst Corp. (formerly Foster Grant). At the same time, Sylvia and the three children have developed a livestock farm where they raise purebred Polled Herefords. Oldest son, Bob, is married, has an MBA from Northwestern, and is in Illinois with Kraft Foods. Gary graduated from the University of Massachusetts and is in management training with Consumer Value Stores, while raising feeder pigs on the farm. Cindy is a student at Assumption, and has her own flock of cheviot sheep at the farm.

Alexander Skopetz, MSEE, reports that he is now classified as an aerospace electronics systems engineer with Reliability and Standards at NASA/GSFC in Greenbelt, Md. Alex, who has been with NASA since '63, worked on the Aerobee rocket and orbiting solar observatory before moving into the standards office. He and his wife Louise stay busy with house, yard, car, church and community chores and with two dogs. ("Well dispositioned and domesticated. Know anyone who'd like two nice dogs?")

Paul Snyder sent his business card from Tokyo, Japan. He's a "venture technical manager" for Mobil. He writes that they should be in Japan "until about this time next year when our project should move to Yanbu, Saudi Arabia on the Red Sea." Mobil is a 50/50 partner with Saudi Arabia on a 250,000 barrel a day refinery to be constructed along with several other major petrochemical facilities out of the desert just east of the fishing village of Yanbu. "Our three children are out in the world making their own living. One is a lawyer, one a chemist, and another a copywriter. This appeared an ideal time in our life to take on an assignment of this type. I expect to be involved in the construction, training of Saudis, start-up and operation of the refinery for the next three or four years. We are enjoying Japan while we are here, learning why they are so productive and competitive as well as enjoying their unbelievable friendliness and gracious hospitality."

Tauno Wuorinen has sent a moving account of his career, his family, and his retirement. Tauno worked, since graduation at CambridgeElectric Light, taking early retirement at age 61 in 1978. He still drops in to visit the place, and is gratified to see systems he introduced being appreciated. He married Aino while at WPI. Aino was a dedicated evangelist, speaking in smaller Pentecostal churches across the U.S. and Canada, and periodically in Finland. She was taken by cancer in 1965. In a subsequent trip to Finland, Tauno met and in three days became engaged to his "new" wife, (since 1967), Kristi. Kristi and Tauno have been blessed with three handsome children, Erika, 12, Anna, 11, and Philip, 9. The family is all involved in church activities, and with retirement, Tauno enjoys the less structured pace. "I usually walk from the post office, and if a mockingbird serenades me, I stop, listen, and thank another of God's wonderful creatures for allowing me to share its joy."

Mike Zucker is now a senior engineer at IBM in Austin, Texas. He writes: "We moved to Texas in October of 1980. Love it here. I started flying single-engine land planes in 1977, and am currently a commercial pilot, instrument rated."

1954

In March, **Owen Allen** started a new job as project manager in the rail transportation group at Sanders & Thomas, Inc. in Pottstown, Pa.

Ouri Carmil is director of sales and planning for the electronics division of Israel Aircraft Industries, Ltd., Israel. He and Devora have four children. . . . . **Harry Mirick** now serves as European comtroller of field service manufacturing for Digital Equipment Corp. in the Netherlands, a three-year assignment. He holds an accounting degree from Franklin & Marshall College.

Dr. **Werner Neupert**, OSS-1 mission scientist at Goddard Space Flight Center, Greenbelt, Md., edited *Office of Space Sciences-1 Experiment Investigation Descriptions*. He has long been concerned with shuttle payloads integration and the rocket experiment project.

In February, **Richard Olson**, professor of mathematics at WPI and scholastic advisor for Alpha Chi Rho, was honored by the brothers on the occasion of the 25th anniversary of his initiation into the fraternity. Two years ago, as faculty advisor for the former local fraternity, Delta Sigma Tau, he spearheaded the local group's joining with the national fraternity, Alpha Chi Rho. The national secretary of the fraternity was a guest at the recognition dinner at which Ollie received a commemorative plaque.

1955

James Clampett is employed as manager of process engineering at Fluor E&C in Irvine, Calif.

Art Rudman has taken a new post as football coach at Madison High School in Madison, Me. Previously he coached at Cheverus High School in Portland, at Rockland High School, North Yarmouth Academy, Millbrook (N.Y.) High School and at Worcester Academy, where for five years he also coached track and wrestling and taught mathematics. Earlier, he served in the Army (aviation) and was a flight tester at Sikorsky Aircraft in Connecticut. Last August the Rudmans purchased "The Elms," a boarding home for the elderly in North Anson, Me. One of the Rudman children, Carl, and his wife, help operate the home. Daughter Karen is finishing her junior year at Ithaca College in New York. Daughter Pam is in Augusta, where her brother, Bill, also lives and works.

1956

Donald Behringer was re-elected to a three-year term on the Ashburnham (Mass.) Municipal Light Board in April. He is a senior engineer at GE in Fitchburg, and has been with the company since 1956. He is a registered professional engineer. The Behringers have five children.

John Derby has been appointed vice president of operations of StanChem, Inc. in East Berlin, Conn. Previously, he was with Air Products and Chemicals, Inc., Allentown, Pa., where he directed overall efforts in marketing, sales, manufacturing, and research and development in two major business areas. He also worked in the production, marketing and operations fields for A.E. Staley Manufacturing Company, the Borden Chemical Company, and U.S. Rubber Company. He has an MBA from Northeastern and belongs to the American Institute of Chemical Engineers. Other activities include the Jaycees and the Community Chest Fund Drive. StanChem manufactures coatings and polymers for the industrial trade. The firm includes three divisions: Albi that produces fire retardant paints and fireproofing coating systems; Designed Products that produces paints and coatings for New England manufacturers; and Polymers that produces water-based polymers for the paint, paper, textile and adhesives industries.

David Gilda holds the post of manager of resident engineering at GE in Allentown, Pa. He and Justine have two children and live in Emmaus. . . . . **Larry Horrigan** has been named vice president of fossil power plant construction by Houston Lighting & Power Company in Texas. In 1978, he joined HL&P after working 20 years for Ebasco Services, Inc., of New York City. He had managed power plant construction for Ebasco, including a number of HL&P projects. After graduating from WPI in 1956, he served for a time with the Army Corps of Engineers. Presently, he is a member of the Houston Business Roundtable. With over one million customers, HL&P is the sixth largest electric utility in the nation in terms of electricity sales.

Donald Olsen spoke on the subject: "Conversion to Coal, A Topic of Interest to All" at the Amherst (Mass.) Community Forum in May. A generation mechanical engineer supervisor, he has been with Northeast Utilities for 12 years. Currently, he is responsible for managing the company's efforts to modify generating plants to use coal, rather than oil for fuel.

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1957

Robert Galligan was recently honored by the National Conference of Christians and Jews for outstanding leadership in human relations and community service in Des Moines, Iowa. He is vice president of Gibbs-Cook Equipment Co., president of the Dowling-St. Joseph Board of Education, and a trustee of the Catholic Diocese of Des Moines. In addition, he is a director at the Mercy Hospital Medical Center, the Central Iowa Health Association, and the Des Moines Area Hospital Consortium. A board member of the National Conference of Christians and Jews, Galligan also is a vice chairman of the Diocesan Committee on Parish Councils, president of the Embassy Club board, and a sponsor in the Vietnamese Refugee Resettlement Program. He holds a master's degree from the University of Connecticut.

1959

Robert Allen has been promoted to captain in the U.S. Navy and reassigned to the staff of the Chief of Naval Operations in Washington, D.C.

Robert Basil is president of Basil Co., Inc., Milford, Conn. He and Sandra have four children. . . . . **Wilfrid Houde** has been named general manager of the personal computer systems division of Apple Computer, Inc. Previously, he was director of distribution and service operations. In 1979, he joined Apple after 15 years of management experience in engineering, marketing and operations with Hewlett-Packard, Inc. Also, he had worked for the Bell System in New Jersey.

Philip Peirce serves as quality control manager for the Worcester Group, Worcester, Mass. The Peirces, who have two children, reside in Brookfield. . . . . **Ed Saulnier** writes that he is still with IBM in the Worcester area, where he serves as a senior systems engineer in the Data Processing Division.

Gordon Sigman, Jr. has joined Norden Systems as vice president of systems and technology. Previously, he was deputy director for advanced technology at the Defense Advanced Research Projects Agency in Arlington, Va. At Norden, a subsidiary of UTC in Norwalk, Conn., Sigman will help plan research and development programs for the company, which is concerned with military electronics and space systems. He holds a degree from Drexel University and was responsible at DAPRA for advanced technology programs in such areas as tactical, strategic, and air vehicles technology. He, his wife, and four children reside in Ridgefield.

1960

Kevin Burke heads the congressional policy section for the U. S. Navy at the Pentagon. . . . . **David Haley** has been named as a new trustee at Monson Savings Bank. Presently, he is manager of Squier & Co., Monson, Mass. A chemical engineer, previously he was associated with Sprague Electric Company, North Adams, and Scott Paper Company in South Hadley. He has a master's degree in public administration from Western New England College.

Correction: In the spring issue of the *Journal*, **Peter Zilko**'s name was incorrectly spelled.

1961

Currently, Dr. **Jack Gabarro** holds the position faculty chairman of Harvard's Center for International Senior Management Studies in Mont-Pelerin, Switzerland, "an assignment which has provided a wonderful personal and family experience as well as a challenging professional one." He is on the boards of several academic journals and professional societies and consults or serves as a board member to a number of business organizations. Recent awards include the McKinsey Foundation Prize and Xerox's "Best of Business" Award, both for contributions to the management literature. Jack and his wife, Marilyn, a graphic designer, have two children, Jana, 11, and Jordy, 2. Their present address is: Avenue du Temple 21 b, 1012 Lausanne, Switzerland.

Al Irelan's 12-year-old daughter, Lisa, qualified for the Eastern Ski Meet, Junior Division, in March. She has been skiing since the age of five, has collected a number of medals and trophies, and shows promise of being Olympic material. Her father, an industrial engineer at Hollingsworth and Vose Co., West Groton, Mass., took part in skiing competition while he was a student at WPI. Currently, Betty, a nurse for the Groton-Dunstable Regional School System, comes in handy when there are cuts and bruises. Peter is a member of the local Junior Hockey squad and also skis competitively. Mad River Run in Vermont is the family's favorite ski resort.

Joseph Janik has been named division manager in Network Systems at the American Telephone & Telegraph Co., Basking Ridge, N.J. In 1961, he began his career as assistant engineer with Southern New England Telephone. In 1971, he became engineering manager at AT&T in New York City. He moved with the company in 1975 to Basking Ridge, where he now lives with his wife and three children. He holds a master's degree in management from Pace University.

Jim Kachadorian has been named by the selectmen to fill a vacancy on the Woodstock (Vt.) Union High School Board. Jim, who is the owner-president of Green Mountain Homes, Inc., holds a BSCE from WPI and an MSCE from MIT. He belongs to Tau Beta Pi, Sigma Xi, and was a founder and charter member of Chi Epsilon. After graduating from MIT, he served with the U.S. Army in Germany, and rose to the rank of captain. He has been active as a member of the Woodstock Finance Committee.

Timothy Meyers, Jr., who has a DDS from Howard University, is presently an assistant professor in the Department of Orthodontics at the Emory University School of Dentistry in Atlanta, Ga. He also has a private practice in Atlanta.

Kenneth Parker is currently self employed as a construction marketing consultant and "enjoys it." He says that he is in regular contact with **Norm Noel**, **Hank Allessio**, **John Powers**, **Len Johnson**, **Pete Natale**, **Svend Pelch**, and **Ed Wozniak**. His son, Matt, hopes to be a member of the class of 1985 at WPI.

Husein Pothiawala serves as production service manager at Pfizer, Inc., in New York City. He has an MS from Northeastern University. . . . . Dr. **Charles Wilkes** has been named director of corporate research for the B.F. Goodrich Company. From the firm's research and development facility in Brecksville, Ohio, he will coordinate all long-range, multidisciplinary research into new technologies, products and processes that support BFG's strategic business goals. He joined Goodrich as a chemist in 1964. Since then, he has held increasingly responsible positions in the areas of chemical physics research and technological assessment. A member of the American Chemical Society, he holds a doctorate in physical chemistry from Princeton.

HOMECOMING OCT. 2-3

1962

Charles Burdick, Jr. holds the position of manager of manufacturing analysis and contracts in test fibers at du Pont in Wilmington, Delaware.

Robert Goretti has been named general manager of Lee's Manufacturing Company, North Providence, R.I. In his new post, he will be in charge of all operations at the plant, a manufacturer of jewelry components. . . . . **Vaidotas Kuzminskas** is employed as an assistant project engineer at United Technologies Corp., Power Systems Division, South Windsor, Conn. He and Gloria have two children and reside in Glastonbury.

Peter Martin was recently promoted to vice president of the Heavy Division of J.F. White Contracting Co., Newton, Mass. The firm has subway tunnels valued at $150 million under construction in Boston and Philadelphia. . . . . **Bruce Simmon** serves as director of business planning and analysis at CSC in El Segundo, Calif. . . . . **Stanley Strychaz** is managing editor of R.S. Means Co., Inc. in Kingstown, Mass.

John Szymanski has been elected president of the New England chapter of the American Society of Travel Agents (ASTA). He was installed by the national chairman of the society at the International Congress of ASTA last winter in Manila, Philippines. He is president of Paradise Travel Service, Inc. of Allston, Mass.

1963

►**Married:** Dr. **William J. Savola, Jr.** to Deborah F. Laprade in Longmeadow, Massachusetts on May 9, 1981. Mrs. Savola attended Springfield Technical Community College and is employed as a general office manager and private secretary by the First Pentecostal Church. Her husband has an MS and PHD in physics from the University of Connecticut, Storrs, and an MBA from New York University. He is a chartered financial analyst and a partner in WJS Associates in Longmeadow.

Laurence Bascom serves as development associate at du Pont in Richmond, Va. He holds an MBA from the University of Tennessee in Chattanooga. The Bascoms have two children.

Thomas Chechile is employed at Pratt & Whitney in Jupiter, Fla. . . . . **David Kilikewich** is head of the test engineering section at Pearl Harbor Naval Shipyard in Hawaii. . . . . **Roger Maddocks** holds the post of superintendent of the Sensitizing Division at Eastman Kodak, Windsor, Colorado. He and his wife, Carole, are the parents of six children.

Joseph Mancuso, who heads the Center for Entrepreneurial Management, Worcester, was in Dallas, Texas when CEM seminars were being held in May. . . . . **Donald Robertson** works as a construction superintendent for McNiff Company in Gloucester, Mass. He has an MBA from Western New England College, is married, and the father of three children.

Harold Taylor serves as program manager at the Hamilton Standard Division of United Technologies in Farmington, Conn. . . . . **Henry Torcellini** is employed as chief engineer at Gardner & Peterson Assoc. in Tolland, Conn. He, his wife Dottie, and two sons, Paul and Robby, reside in Eastford. . . . . **Mitch Weingrad** is self employed in insurance in East Rockaway, N.Y.

1964

Dennis Balog has been appointed general manager of miniature lighting products for GTE Lighting Products in Hillsboro, N.H. He will be responsible for engineering, manufacturing, and marketing of a broad line of lamps for the automobile, aircraft, electronic, telephone, computer and other industries. In 1964, he joined GTE's operations in Waltham, Mass., as a field engineer and he has held a series of increasingly responsible engineering posts. In 1972, he was promoted to technical general foreman, and four years later became materials manager of miniature lighting products. He has been plant manager of GTE Lighting Products automotive headlamp manufacturing facility in Seymour, Ind. since 1978. His memberships include the IEEE and the Illuminating Engineering Society.

1965

Phil Baker was recently promoted to product manager of industrial products at Polaroid Corporation in Cambridge, Mass. This post, in the Tech Photo Marketing Division, follows his previous positions within the Engineering Division. Phil lives in West Peabody, Mass. with his wife, Jane, and two children, Karen and Danny.

Leo DeBlois, Jr., a senior engineer in Polaroid's international division, received a master's degree in business administration from Boston University's School of Management on May 17th. He also holds a master's degree from the B.U. College of Engineering. He is a member of the American Society for Quality Control and the Society of Photographic Scientists and Engineers.

Dick Kennedy has been promoted to vice president and general manager of the Vitrified Grinding Wheel Division at Norton Company, Worcester. Formerly, he was director of computer systems and services. He is vice chairman of the WPI Alumni Fund Board as well as chairman of the Class Agent Program.

Henry Schneck continues to work for the Suffolk County Department of Public Works, where he is principal civil engineer in charge of traffic engineering and construction supervisor. . . . . **William Shields** and his wife have moved from Beacon Hill in Boston to Manomet, just south of Plymouth, Mass. They now have a 53-acre plot with two working cranberry bogs and plan to plant vinifera grapes in the near future.

Steve Sutker has joined Hazeltine Corporation, Greenlawn, N Y., where he is national sales manager of Computer Terminal Equipment. Previously, he was the mid-Atlantic regional manager of the General Distribution Division for Data General Corporation. He, his wife Carol, his dog, Oliver, and son, Nolan, reside in North Syosset, New York.

1966

Robert Levine is vice president and general manager of Huck Manufacturing Co., Kingston, N.Y. He has an MS from Northeastern University, is married, and has two children.

John Petrie holds the position of manager of applications and business development at ITT North Microsystems in Deerfield Beach, Florida. . . . . **Lawrence Pihl** serves as a manufacturer's representative at BBC in Chelmsford, Mass. He received his MBA from Northeastern. . . . . **Bob Shaw** owns Lisa's Auto Sales in Worcester.

Thomas Shepelrich holds the post of chief estimator at Metric Constructors, St. Petersburg, Fla. He and Carol Lou have one child and live in Tampa. . . . . **Earl Sparks** has been transferred to the fertilizer group of International Minerals & Chemical in Chicago. He is a senior project engineer working on an ammonia transport project that involves two 35-mile pipelines, a 50,000-ton storage tank, and a 12,500-ton ocean-going barge to move ammonia from Louisiana to Florida.

Robert Sternschein is now employed as manufacturing manager at Easco Hand Tools in Springfield, Mass. He and Norma Jean have three children and live in Simsbury, Conn.

Maj. **John Stockhaus** is now post civil engineer at Camp Edwards. Formerly, he held the same post at Camp Grayling, Michigan. In his new position, he will be responsible for the maintenance and repair of facilities and will oversee construction of minor projects at Camp Edwards. Maj. Stockhaus is a veteran of 18 years, eight of those in the National Guard. He served two years in Vietnam with the 1st Cavalry Division. He and Becky have two children.

Roman Sywak, who has an MBA from Western New England College, is a senior product support engineer at Pratt & Whitney Aircraft, East Hartford, Conn.

HOMECOMING OCT. 2-3

1967

Charles Blake holds the position of manager of the Atlanta, Ga. office of Clayton Environmental Consultants in Marietta.

James Braithwaite is a staff engineer at Hercules-Aerospace Division in Cumberland, Md. . . . . **Fernando Castillo** was recently named manager of the Performance Analysis Section at Riley Stoker Corp., Worcester. With the company since 1970, he had been supervisor of engineering standards. . . . . In February, **Richard Court, Jr.** was promoted to manager of quality control services for Boehringer Ingelheim Ltd. of Danbury, Conn. His daughter, Katherine, was a year old in May. . . . . **John Facca** is a self-employed sales representative in New Britain, Conn.

Richard Gutkowski, associate professor of civil engineering at Colorado State University, has written a textbook, *Structure: Fundamental Theory and Behavior*, recently published by Van Nostrand Reinhold. The book outlines for engineers the theory of structural analysis procedures, mathematical operations and storage techniques of computer programs, and offers new explanations of fundamental theorems and assumptions that underlie the science. Gutkowski has a master's degree from WPI and a doctor's degree from the University of Wisconsin, Madison. He joined the Colorado State University faculty in 1973. Formerly, he was a structural designer and computer programmer at Harvey and Tracy, Worcester.

Frank Jodaitis received his MBA from RPI last August.

James Lawson, Jr. holds the post of manager, MIS, at Simplex Time Recorder Co., Gardner, Mass. . . . . **Denis McQuillen** has a new position as vice president of engineering for a division of Gulf & Western Corporation at their New York City headquarters. In this capacity, he will be responsible for corporate engineering projects. His background includes broad engineering project management responsibility on a diversity of construction projects throughout the world. For the past five years with E.R. Squibb & Sons in Princeton, N.J., he was a senior project manager and managed multi-million dollar pharmaceutical projects in New Jersey, Puerto Rico, and South Africa. Most recently, he began a project for the People's Republic of China. Denis, who lives with his wife Susan and their two children in Lawrenceville, N.J., has been listed in the 1981–1982 edition of *Who's Who in the East*.

John Sonne writes: "I have been a partner in our practice for over a year. I've also enjoyed doing public affairs for the area veterinarians by writing news releases for radio and newspapers, as well as doing a number of TV interviews."

1968

►**Married: Michael J. True** and Judith A. Baker in Woodfords, Maine on May 2, 1981. Mrs. True graduated from Portland High School and is employed by New England Telephone. Her husband, who also studied at the University of New Haven and at the University of Southern Maine, is with Overhead Door Co. of Portland, a division of Maine Building Specialties.

Dr. **Donald Aldrich** is a research supervisor at du Pont's Troy Laboratory in Michigan. He has a PhDfrom MIT, is married, and has two children. . . . . Recently, **Kurt Benson** became associated with the law firm of Salter and Michaelson in Providence, R.I. The firm is concerned with patent, trademark, and copyright law.

Robert Edge, vice president of Edge Wallboard Machinery Company, Downingtown, Pa., was elected secretary-treasurer of the Pulp & Paper Machinery Manufacturers' Association (PPMMA) at its annual meeting in March. Edge, the outgoing president of the nationwide trade organization, was cited for his initiative in new membership development, the increased activity of PPMMA in product liability reform, and the increased activity of the organization's board of directors and executive committee. He lives in Romansville, Pa. with his wife, Patricia, and two children.

Kenneth Ekstrom works as an electronics engineer at Comm-Term Corp., Maynard, Mass. . . . . **Robert Falciani** holds the post of area office manager at EES, Inc., in San Francisco. He has an MSME and an MBA from Northeastern.

Bert Gunter is a member of the technical staff at RCA Labs in Princeton, N.J. . . . . **Gerald Junevicus** has resigned as assistant professor at the Higher Institute of Technology in Brack, Libya. He holds a master's and a doctor's degree from the University of Victoria, Canada. . . . . **Robert Lowell**, a project physicist in electromagnetic technology at TRW Defense & Space Systems, Redondo Beach, Calif., is also working on his MSEE in communications at the University of Southern California.

Edward O'Hara serves as a senior piping engineer at ITT Grinnell Industrial Piping, Inc., Lycoming, N.Y. He and Debra have one child and reside in Oswego. . . . . Last September, **Richard Perreault** left the Army. Presently, he is a project engineer with the Flood Control District of Maricopa County in Phoenix. ("Yes! It does flood in the desert!")

Richard Sadowski was a featured speaker at the 69th annual convention and power show of the New England States Association of Power Engineers held in Sturbridge, Mass. in May. In his talk, he described how more and more industrial plants in New England are reintroducing coal as a more affordable fuel at a time when energy costs are a priority matter.

Stephen Schwarm is newly employed as a principal research engineer at the Foxboro (Mass.) Co. He is involved in corporate research. . . . . **Robert Smith** serves as a computer management consultant with Computer Partners in Wellesley Hills, Mass. . . . . **John Starsiak, Jr.**, who holds an MS in chemistry from Northeastern, is presently a student at the University of Kansas.

Charles Trent has been appointed as market development manager for basic dyes by the Dyes and Chemicals Division of Crompton & Knowles Corporation, Charlotte, N.C. In his new position, he will coordinate all marketing activities for C&K's line of Sevron© basic dyes which were formerly made by du Pont. Previously a technical services supervisor for the company at its Reading, Pa., laboratories, Trent will now be based at the division's marketing headquarters in Charlotte. He joined Crompton & Knowles as an analytical chemist in 1974, and holds an MBA from Lehigh University. A member of the American Association of Textile Chemists and Colorists, he also belongs to the American Chemical Society. C&K's Dyes and Chemicals Division is a major supplier of dyes and chemicals used by the textile industry for synthetic and natural fibers. Crompton and Knowles manufactures specialty chemicals and special industry machinery.

Peter Walsh serves as associate director ("head hunter") for Engineering Career Associates, Burlington, Mass. Last year, he received his MBA from Suffolk University. He and Marybeth live in Plymouth, Mass. and are the parents of three children.

1969

Richard Check is employed as a project manager at CH2M Hill Engineers in Atlanta, Ga. Presently, he is involved in the design and construction of water and wastewater facilities. He has an MSCE from Northeastern University, is married, and resides in Stone Mountain.

Michael Hart continues as a senior engineer at Raytheon's Missile Systems Division in Bedford, Mass. . . . . Recently, **Arthur Katsaros** was named nitration products business manager for Air Products and Chemicals, Inc., Allentown, Pa. He is responsible for overseeing performance of Air Products' nitrations business. The company produces dinitrotoluene (DNT) and toluene diamine (TDA)—intermediate materials used to manufacture toluene diamine diisocyanate—at its plant in Pasadena, Texas. Prior to his appointment, Katsaros was business development manager of nitration products for the company, which he joined in 1973. He holds an MBA from Lehigh.

Edward Mierzejewski was a co-author of "Impacts of Elderly and Handicapped Transit Fare Policies", which appeared in the March issue of the *ITE Journal*. Recently, he was named director of transportation programs at Henningson, Durham & Richardson in HDR's Alexandria, Va. office. HDR is a nationwide architectural, engineering, and planning firm. In 1973, he joined CRW, where he had broad responsibilities in transportation and environmental planning, including proposal preparation, technical studies, client coordination, and report preparation and presentation. He has an MSCE (Transportation Systems Division) from MIT. He writes: "Together with Aline and children, Sara, 9, and Mark, 6, we are continuing to enjoy the good life in Virginia, where we have been for ten years."

Joel O'Rourke is a computer scientist at Computer Sciences Corp., Herndon, Va. He writes: "Working on Saudi Arabian MIS project." He and his wife, Kathy (Meehan), whom he married last October, reside in Fairfax, Va.

Dr. **Donald Rule** is now working for the Navy Department in the Naval Surface Weapons Center in White Oak, Md., where he does research in nuclear physics. He and other members of his team have been developing a particle beam weapon for defense purposes. The particle beam is a stream of highly energetic atomic or subatomic-size particles such as electrons, protons, hydrogen atoms, or ions. Laser beams, conversely, consist of radiant energy photons. An electron beam would resemble a lightning bolt, while a laser beam would be an intense beam of heat. The major component for the beam weapon is the accelerator, which functions in a manner similar to a TV electron gun, although much more powerfully. Rule, who works on the material response interaction team, received his doctorate in physics from the University of Connecticut.

Last October, **Joseph Senecal** joined the corporate research department at Cabot Corporation, Billerica, Mass. . . . . **Joe Stahl** is now engineering manager for the Pro Brush Division of Rexall Co. in Florence, Mass.

1970

►**Born:** to Mr. and Mrs. **Roger Henze** their first child, Brian Matthew, on August 2, 1980. Wife Judy is an English instructor at Savannah State College.

Paul Akscyn serves as a consulting engineer at Crawford & Russell in Houston, Texas. . . . . **Henry Block** is a real estate associate at Jack Thomas, Inc., Miami, Fla. He and Cathy have two children.

Kenneth Brown has received his doctor of engineering degree in mechanical engineering from RPI, Troy, N.Y. Currently, he is a research engineer in the structures technology group of the Commercial Products Division of Pratt & Whitney Aircraft, a division of United Technologies. His wife is studying clinical dietetics at the University of Connecticut.

Garreth Cooke serves as a design engineer at GE's Aircraft Instrument Division in Wilmington, Mass. . . . . **Daniel Czernicki** serves as a project engineer at NUSC in Newport, R.I. He and Mary Beth have one child and live in Saunderstown.

Mark Gemborys is a research chemist at Sterling Winthrop in Rensselaer, N.Y.

"The Electric Disco Chicken", an animated short by **Bob Goodness** of Shrewsbury, Mass., represented the U.S. at the 1981 Cannes International Film Festival. It was selected by the director of the festival from films in international competition and was the only super 8mm film from the U.S. selected to be screened there this year. Super 8mm films have not been shown at Cannes in the past. Bob's film has previously won awards at the 1980 Toronto Super 8 Film Festival and the 1980 New England Film Festival. It has also been screened at a number of festivals throughout North America and Europe.

Jeffrey Manty has been named division engineer of the Saucon Mills Division of the Bethlehem Steel Corporation. Saucon Mills Division is the largest single structural steel shapes producing and shipping complex in the free world. Manty's wife, Christine, is an officer and branch manager of the Nazareth National Bank. The Mantys and their two children reside at Little Acre Estates in Nazareth, Pa.

Robert Mulcahy holds the post of district manager at New England Telephone in Boston. The Mulcahys reside in Manchester, Mass. and have one child. . . . . **Wah Sing Ng** continues as a management consultant with Stone and Webster, New York City.

Robert Rosenberg holds the position of president at Robert A. Rosenberg, Inc., Quincy, Calif. He is a graduate of the Realtors Institute. . . . . **Erik Roy** has joined the GE Research and Development Center, Schenectady, as a specialist in technology transfer services. Prior to his Center appointment, he served for eight years with the Mohasco Corporation, first as an industrial engineer and later as manager of licensing operations. He has a master's degree in industrial administration from Union College.

Robert Spiro, who is with DuBois Chemicals of Cincinnati, sells both process and maintenance products to industrial marketplaces in manufacturing, food, and transportation. Also, he is into water treatment, including boilers, cooling towers, and effluent water, "not to mention polymer and synthetic energy-saving lubricants and equipment." He is located in Worcester. During the summer, he crews on a 40-ft. racing sailboat on Narragansett Bay, and in winter he enjoys Killington.

1971

►**Born:** to Barbara and **David Winer**, a son, Jesse Lee, on June 29, 1980.

Andrew Griffin works as a project engineer at Tau-Tron in Chelmsford, Mass. . . . . Dr. **David Hobill**, who holds an MSC from the University of Calgary and a PHD from the University of Victoria, both in Canada, is currently a post doctoral fellow in the Laboratory Physique Theorique, at Institute Henri Poincare in Paris, France.

Ken Kowalchek is budget and management officer for the Department of State in Washington, D.C. He has an MBA from UMass, is married, and has two children.

Edward Lowe III has been promoted to manager of marketing programs for the Installation & Service Engineering Division of GE in Schenectady, N.Y.

Gary Mason has the position of executive vice president of Stevens Linen Assoc., Inc., Webster, Mass. The Masons live in Dudley and have one child. . . . **Joe Moia, Jr.** is employed at Hughes Aircraft Co. as a member of the technical staff in El Segundo, Calif. **Robert Payne** is project manager of business development for the Standard Oil Co.-Vistron Corp. in Cleveland, Ohio.

William St. Hilaire holds the post of regional environmental engineer for Metropolitan Boston/Northeast Region, Commonwealth of Massachusetts, in the Department of Environmental Quality Engineering, Woburn, Mass. He and Diane have three children and reside in Clinton.

Francis Serieco has been named staff executive for strategic planning and development in the GE consumer products section, Fairfield, Conn. He joined the company in 1979 as manager of strategic planning and development. Formerly, he worked for the Boston Consulting Group, Inc., a management consulting company. He holds an MBA from Columbia and lives in Redding, Conn.

Bob Sinierope teaches at Milton Academy. He earned his master's degree in mathematics education at Boston University. The Sinicropes and their two children reside in Milton, Mass. . . . . **Frank Steiner** was recently elected treasurer of Energy Management and Control Company, a consulting firm specializing in industrial gas turbines. He is located in Marlboro, Mass.

Frederick Szufnarowski is now a project engineer-generation in the civil engineering department at Northeast Utilities, Hartford, Conn. . . . . **Bruce Tompkins** works as a construction superintendent for C.H. Nickerson & Co., Inc., of Torrington, Conn., and is concerned with water pollution control. . . . . **Michael Weill** works as a senior engineer at Union Carbide Corp., Tarrytown, N.Y.

Glenn White writes: "I finally completed my PHD in atmospheric sciences at the end of January. The thesis was entitled 'A Comparison of the Summertime and Wintertime Circulations of the Extra Tropical Northern Hemisphere.' I am now a postdoctoral research associate here at the University of Reading (England) and hope to stay through the end of 1982. I am working on the global circulation of the atmosphere and every two weeks calculate several statistics describing the state of the atmosphere during the previous two weeks. The computing is done at the European Centre for Medium-Range Forecasts."

HOMECOMING OCT. 2-3

1972

►**Married: Adrien Gaudreau** and Linda Holeman of Portland, Oregon on August 8, 1980. Mrs. Gaudreau has a BS in forest science, a BS in recreation planning, and an MA in environmental planning. She works for the Bureau of Land Management in Alaska, where she is concerned with environmental impact studies. . . . . **James H. Purington** and Christine A. McHugh in Waltham, Massachusetts recently. The bride received her chemical engineering degree from Tufts University, Medford. Her husband, who has an MS in environmental engineering from Colorado State University, is with Recycling Industries in Braintree.

►**Born:** to Mr. and Mrs. **Joseph G. Harkins** a son, Joseph Gerald III, on July 1, 1980. Sister Kimberly Anne, is now four. Harkins is manager of the Large Systems Division for Manufacturer's Business Systems, Inc., a Worcester-based EDP consulting firm.

David Bailey is employed by General Dynamics in Groton, Conn. . . . . **Charles Brine** is currently a senior research chemist at FMC Corporation in Princeton, N.J. He has a PHD from the University of Delaware.

Gordon Chess is dean of the faculty of engineering science at the University of Western Ontario in London. He and Margaret have three children. . . . . **Walter McIlveen** serves as chief mechanical engineer at Diaz, Seckinger Assoc., Tampa, Fla. He has an MSME from RPI and an MBA from Wayne State University, Detroit, Michigan.

David Meyer presently serves as manager of Arthur Young & Co. in San Francisco. . . . . **Robert Pascucci** is now overseeing the construction of the sixty-unit senior citizen apartment complex now underway on Glen Street in Glen Cove, N.Y. He is a vice president of the Jobco Realty and Construction Company of Great Neck, redevelopers of the Glen Street property. He has a law degree from St. John's University. At one time, he was associated with a New York City construction company, and was later an engineer for the Glen Cove Urban Renewal Agency. He rejoined the Jobco firm in July of 1980.

1973

►**Born:** to Bonnie and **Chris Broders** their first child, Sarah Elizabeth, on November 25, 1980. . . . . to Donna and Dr. **John H. Ward** a daughter, Jessica Elizabeth, on May 2, 1981.

Tom Bileski is district sales manager at Texas Instruments in St. Louis, Mo. The Bileskis have a daughter, Lara Ann, and reside in Ballwin. . . . . **Peter Conti** works as a lead geotechnical engineer for Stone & Webster in Cherry Hill, N.J. The Contis live in Laurel Springs. . . . . **Kevin Crossen** serves as a chemist for the Food and Drug Administration in Silver Spring, Md.

William Elliott serves as manager of program development in the International Projects Department at GE in New York City. Last year, he received his MBA from Columbia University. . . . . **Jon Franson** continues with the USAF Weather Data Requirements Section at RAF Croughton, United Kingdom.

Robert Haywood holds the post of director at Tedelex Far East, Ltd., in Hong Kong. . . . . Next fall, **Glen Johnson** will rejoin the faculty at Vanderbilt University as an associate professor of mechanical engineering. He is married to the former Kathryne A. DeLoach of Jackson, Tenn. They have two sons, Edward and Eric.

Christopher Kralik is a process design engineer at C.E. Lummus, Bloomfield, N.J. . . . . Since February, **Peter McDermott** has been employed as a patent attorney in the Patent Law Section of the Office of the General Counsel at Ford Motor Co., Dearborn, Mich. He holds a JD from Suffolk University Law School.

Kenneth Muccino has been promoted to senior engineer at Northeast Utilities in Hartford, Conn. He joined the Connecticut Light and Power Company, an NU subsidiary, as a cadet engineer in Norwalk in 1973. He held positions of increasing responsibility in the Norwalk district and in the utility's southern region headquarters office, Stamford, before transferring to NU's general offices in Berlin in 1979. At the time of the move, he was promoted to engineer in the Engineering and Operations Capital and Expense Management Department. A registered professional engineer in Connecticut and a member of the IEEE, Muccino also holds an MBA from the University of Connecticut. He is married and the father of a son, Kenneth M. Muccino.

Paul Parulis now works for Northeast Utilities Service Co. in the betterment construction group at Connecticut Yankee Atomic Power Station. . . . . **Daniel Prior III** was recently appointed to supervisor of work methods at New England Electric, Westboro, Mass. . . . . **Rand Refrigeri** has qualified as a professional engineer in Massachusetts. Presently, he is employed with the Carlson Corporation of Cochituate, Mass., where he is a mechanical engineer.
Mark Richards owns Pizza Transit Authority in Durham, N.C. He writes: "We have recently purchased the Durham franchise of P.T.A. and are enjoying the pleasures of self-employment." . . . . **Wayne Schweidenback** is an electrical control engineer at Stone & Webster, Boston. He and Jeannette, who have three children, live in Norfolk, Mass. . . . . **Russell Smith, Jr.** is a project engineer at Texon, Inc., South Hadley, Mass.

Presently, **Steve Turo** holds the post of process development engineer at Fiber Industries, Inc., a manufacturer of polyester filament yarn in Greenville, S.C. . . . . **Ralph Veenema, Jr.** has a new job in coal gasification development with Combustion Engineering Power Systems Group, Windsor, Ct. . . . . **Robert Yesukevich** holds the post of superintendent of oil processing operations for UOP, Inc., Des Plaines, Ill. He is presently located at the Riyadh oil refinery in Saudi Arabia.

1974

►**Married:** Capt. **Donald W. Gross** and Tracie F. Tudor in McLean, Virginia on April 11, 1981. The bride graduated from American University. The groom serves as a pilot for the U.S. Air Force. . . . . **Bruce Lackey** to Ferryal Ghovanlou in Newport Beach, California on November 29, 1980. Mrs. Lackey attended Chapman College and the University of California, Irvine, and currently works for Gucci. Her husband is a senior account manager and regional analytical specialist for Taylor Instrument Company. The couple is residing in the San Francisco East Bay area.

►**Born:** to Belinda and **James Asaro** their second child, Jason Alexander, in June of 1980. Asaro is temporarily a warehouse supervisor for Pepsi-Cola in Long Island City, N.Y., pending a flight officer position with a commuter airline. . . . . to **William** and **Paula Fragassi Delaney, '76** a daughter, Kate A. Delaney, on December 4, 1980. Last November, Bill transferred to Norton in Worcester as a pilot plant engineer. . . . . to Pat and **David Packard** a son, Brian David, on January 29, 1981. David is an engineer in the Production Division of the Public Service Co. of New Hampshire. Pat is now a full-time mother.

Douglas Borgatti holds the position of process control engineer for the Passaic Valley Sewage Commission. This year he receives his PHD from Notre Dame. In 1976, he received his MSEE from Manhattan College. . . . . **Robert Cikatz** serves as a quality control engineer at NE Nuclear Energy Co., Waterford, Conn. He and Mary reside in Fitchville.

Richard Corey, a former U.S. Postal Service employee, has written a book to help potential postal service employees score high on their competitive examinations. His book, *The Guide to Postal Examinations*, was recently published by Reston Publishing Co. Written exclusively for postal service clerk-carrier and machine clerk exams, the 127-page guide offers study and practice exercises, as well as tips designed to increase a person's speed and accuracy on the tests. His Corey method of numeric translation is a system of remembering two-digit numbers. He used it to speed his former work as a mail sorter, and it is aimed straight at developing high scores in the memory section of postal examinations. By using his method, he scored 100 on the memory sections of tests given at White River Junction, Vt., Newark, N.J., and in Winsted and Hartford, Conn., and was offered postal jobs at each location. Currently, Corey owns a company that installs burglar alarms.

Bill Gemmer is now an account engineer for Industrial Risk Insurers in Hartford, Conn. Bill, Lisa, and their daughter Lindsay Rose reside in Canton. . . . . **Edward Gordon** is a systems programmer IV at Racal-Milgo in Ft. Lauderdale, Fla. He is also working for his MSCS at Villanova University. . . . . **Dennis Howard** received his master's degree in civil engineering from Tennessee Technological University in March.

Capt. **Thomas Kielick**, military science professor at Siena College, has been awarded the Meritorious Service Medal for outstanding service to the U.S. Army. A resident of Watervliet, N.Y., he has been on the Siena faculty staff since August of 1980. . . . . **Skip Leanna** is employed as a construction project engineer at East Kentucky Power, Winchester, Ky.

Ronald L'Heureux serves as a reliability engineer at RCA Automated Systems in Burlington, Mass. . . . . **David Nickless** has graduated from law school and is now associated with the Boston firm of Marullo and Barnes, where he is hoping to specialize in energy law, especially as it relates to small-head hydroelectric facilities and cogeneration agreements. His wife, Debbie Phillips, will be teaching at Suffolk Law School next year. They live in Billerica, where Dave is active in the local youth soccer program.

Mary Bollino Petry, who is married to **Jeff Petry, '72**, writes from Brighton, Mich. that Jeff is now 7, Tony, almost 6, and Laural, 4.

Matteo Solitro is a project engineer at Mobay Chemical Corp., Pittsburgh. He and Clelia have three children and live in Coraopolis, Pa. . . . . **Peter Walworth** works as a senior facilities engineer for Applicon, Inc., Burlington, Mass.

1975

►**Married: Jon T. Anderson** and Elizabeth A. Dennis in Dallas, Texas on March 7, 1981. The bride holds a BA in Spanish from the University of Texas and graduated from the University of Texas School of Law in 1978. She is an Assistant Attorney General for the State of Vermont. Her husband graduated from Yale Law School in 1978. He is a lawyer with the firm of Paterson, Gibson, Noble & Goodrich in Montpelier, Vt.

►**Born:** to Judy and **Joseph DelPonte** their first child, Jonathan Armand, on January 12, 1981. DelPonte is a physicist at Boeing Military Airplane Co., Huntsville, Alabama.

Michael Amaral is an electronics engineer at the Naval Underwater Systems Center in New London, Conn. He has an MS from the University of Connecticut. . . . . **Robert Apkarian** serves an an electron microscopist at the University of Louisville in Kentucky. In January, he completed his MA requirements at Clark University. . . . . **Ronald Ballinger** is an assistant professor at MIT.

H. Scott Bicknell is now a senior industrial engineer in the General Motors Assembly Division in Warren, Mich. He and Brenda live in Sterling Heights. . . . . **William Booth**, who has an MS from Cornell and a JD from George Washington University, is presently an associate attorney with Fish & Richardson in Boston, Mass.

Steven Coes holds the post of administrative assistant in the town of Seabrook, N.H. He and his wife, Betsyanne reside in Newfields. . . . . **Fred Cordella** is currently employed at Cullinan Engineering in Auburn, Mass. . . . . Dr. **Bruce Croft**, who has a doctor of podiatric medicine from the Chicago (Ill.) College of Podiatric Medicine, now has two offices: one in Worcester and another in Cambridge, Mass.

Currently, **William DiBenedetto** works as a production manager in the field service manufacturing operation at Digital Equipment Corporation.

In March, **Judith Nitsch Donnellan** was chosen by the Southeast District of the Massachusetts Federation of Business and Professional Women's Clubs, Inc., as its candidate for Young Career Woman. She represented the district at the state convention held in Newton in May, and is a member of the Attleboro Area Business and Professional Women's Club, Inc. She serves as vice president of Freeman Engineering Company of Attleboro. A registered professional engineer in Massachusetts, she also belongs to the Boston section of the ASCE and the Society of Women Engineers (SWE). In conjunction with the SWE, she often lectures to groups of girls on engineering as a career. She is co-author of a coloring book, "Terry's Trip," which introduces engineering careers to grade school girls.

Martin Fugardi has accepted the position of vice president of engineering at the O. A. Peterson Construction Co., Montclair, N.J. The firm specializes in industrial, commercial, and institutional design and construction.

James Law, a civil engineer, is with the U.S. Corps of Engineers in Waltham, Mass. He and his wife, Elaine, live in West Boylston. . . . . **Dr. Joseph LeBritton** writes that he has taken a new job as senior research fellow in elementary particle physics at the University of Arizona in Tucson. His experimental work will be performed at the National Accelerator Lab. in Batavia, Illinois.

Philip Ledoux serves as a research scientist at Fisher Scientific Co., Orangeburg, N.Y. He and Katherine have three children and live in Spring Valley. . . . . **Richard Murray** is with Aerojet Electro Systems in Azusa, Calif. . . . . **David Salomaki** holds the position of engineering project manager at Hewlett-Packard, Cupertino, Calif. . . . . **Jeff Webber** is a mechanization requirements analyst for GE Ordnance in Pittsfield, Mass., where he lives with his wife and one child.

1976

►**Married: William P. Casey** and Rhonda L. Johnson on April 25, 1981. The bride graduated from Quinsigamond Community College, Worcester, and is a secretary for Riley Stoker Corp.

►**Born:** to Mr. and Mrs. **Dick Crafts** their first child, a daughter, Johanna Marie, on October 21, 1980. Dick is now superintendent at Occidental Chemical's Swift Creek sulfuric acid plants in White Springs, Fla.

Richard Allen of New Hampshire and **Michael Schultz**, '75 of Cambridge, Mass. have formed the partnership of Allen & Schultz to be headquartered in Lyme, N.H. The newly established firm will offer civil, environmental, and geotechnical consulting engineering serves to clients throughout the Northeast. Allen, who also graduated from the University of Washington, has had research experience at McGill University, regulatory agency experience with the EPA, and consulting-engineering experience with firms in New England and the Pacific Northwest. Schultz has a degree from MIT and has had research and consulting experience including project work in New England, the Pacific Northwest, Alaska, and the Middle East. With the inclusion of two other principals, the firm holds professional engineering registration in the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Washington.

Gary Anderson is a sales proposal engineer for Cincinnati Milacron-Heald, Worcester. . . . . **Raymond Calabro, Jr.** holds the post of supervisor of pipe support engineering at Daniel Construction, Jenkinsville, S.C. . . . . **Bill Clark** has made a recent job change. Presently, he works for dbx, Inc. in Newton, where he is approvals engineer. The company is a manufacturer of professional and consumer audio equipment.

Tony Clawson holds the post of financial manager at Digital Equipment Corp., Acton, Mass. . . . . **David Cordella** is now employed as a senior engineer in the mass storage department at Data General in Westboro, Mass. He is married, lives in Worcester, and has two children: a daughter, nearly 5, and a son, 18 months. . . . . **Val Danos** holds the position of manager of the Planning & Program Development Unit at Arizona Department of Health Services in Phoenix. "Still moving around like a gypsy."

Chris Ford, who joined Procter & Gamble last November, now serves as a team manager at P&G Paper Products, Cape Girardeau, Mo. He left the Army as a captain in October. The Fords are the parents of a son, Michael, who is almost a year old. . . . . **James Fountain** is an associate engineer for Northeast Utilities Service Company, Waterford, Conn. . . . . **Richard Isaacs**, who works for the Boeing Company, is pursuing his MBA at the Albers School of Businesss at Seattle University in Washington.

Stephen Jennette has been promoted to senior systems programmer for the Computer Services Department at Norton Co. . . . . **Thomas May** is a district engineer at the Torrington Co. in Dallas, Texas. . . . . **Robert Milk, Jr.** serves as a system engineer for Electronic Data Systems, Dallas. He and Elaine have one child and live in Garland, Texas.

Kestutis Pauliukonis, who received his MD from Georgetown University last year, is presently an anesthesia resident for the U.S. Navy at the National Naval Medical Center in Bethesda, Md.

James Roberge recently received an MSME from the University of Rhode Island. He is employed by GE, and is located in Erie, Pa. . . . . **Edward Sawicki** serves as a staff engineer at EES, Inc. in Boston. He and Janis have two children and live in Norton, Mass.

Ashokkumar Shah holds the position of New York branch manager at Digital Equipment Corporation. . . . . **Brian Swanson** is employed as manager of the finishing plant at Norton Co., Huntsville, Alabama. . . . . **Tom Wimbrow** holds the position of design engineer at Brown & Root in Houston, Texas. Also, he is working for his MBA at the University of Houston. . . . . Capt. **Neal Wright** was stationed in Korea in April and will remain there until July of 1982.

HOMECOMING OCT. 2-3
1977

Ed Acciardi is a senior design engineer at Data General Corporation in Westboro, Mass. He works in the mass storage division of corporate research and development.

Stephen Akers, who received his MS in ocean engineering from URI last year, is now a civil engineer for the USAE Waterways Experiment Station in Vicksburg, Miss. . . . . **Brian Belliveau** serves as a sales engineer at New Hampshire Ball Bearings, Inc., Peterborough, N.H. He and Brenda have two children and reside in Jaffrey.

Richard Blauvelt continues as director of marketing at True Trace in Whittier, Calif. . . . . **Gary Bujaucius** has been promoted to actuarial associate within the actuarial organization at the Hanover Insurance Company, Worcester. Following graduation, he joined the company as an actuarial assistant. . . . . **Gerard Chase** serves as a boiler design engineer at Combustion Engineering in Windsor, Conn. He and Cynthia live in West Suffield.

Wayne Civinskas is now a design engineer in the Digital Systems Development Group at RCA Automated Systems in Burlington, Mass. He has an MSEE from WPI.

Dr. **Ismael Colon** was recently advanced to project scientist in the Coatings Materials Division of Union Carbide Corporation's Bound Brook research facility in New Jersey. He holds a PhD from WPI and a BS from Fairfield University. Prior to joining Union Carbide in 1977, he was an assistant professor of chemistry at WPI.

Bill Cunningham has a summer job as a marketing consultant to the computer and telecommunications industries at Pactel, Inc. in Princeton, N.J. He attends Tuck School at Dartmouth. . . . . **Michael DiMascio** is a fire protection engineer for the City of Redwood City in California. . . . . **Richard Garstka** was recently promoted to systems consultant within the systems organization at State Mutual Life Assurance Company of America, Worcester. He joined the company last year as a senior systems analyst. . . . . **John Harvey** continues as construction manager at Francis Harvey & Sons, Inc., Worcester. He and Elizabeth have two children.

John Hjort serves as an associate engineer-programmer at IBM in Essex Junction, Vermont. . . . . **Jeri Hodsdon** is employed as senior manufacturing engineer at Data Packaging Corp. in Cambridge, Mass. . . . . **Robert Hyland** is a research associate at Temple University in Philadelphia. He holds an MA in biophysics from Johns Hopkins.

Rafael Lai serves as ingeniero inspector for the City of Ciudad Bolivar in Venezuela. Last year, he received his MSCE from WPI.

. . . . **Norman Marshall** is a graduate research assistant at Thayer School of Engineering, Dartmouth College. . . . . **Fred Sowa** is a senior project engineer at Clairol, Stamford, Conn. . . . . Currently, **Brian Stratouly** works as a design engineer at Santa Fe Engineering Service Co. in Orange, Calif.

Jer-Shi Ting holds the position of managing director at K. Cotton & Gauze Co., Ltd., Bangkok, Thailand. . . . . **George Whitwell** writes that he has one more year at Cornell before receiving his PhD degree in inorganic chemistry.

McRea Willmert serves as a process engineer at Great Western Silicon, Chandler, Arizona.

1978

►**Born:** to Marcy and **Ronald E. Fish** their first child, Seth David, on January 31, 1981. Fish is currently employed as an avionics design engineer by Northrop Corp., Hawthorne, Calif.

Lt/jg **Bramwell Arnold, Jr.** continues as a pilot with the U.S. Navy. Presently, he is flying a Navy A-7E on board the USS Midway, homeported in Yokuska, Japan. . . . . 1/Lt. Richard Bourgault serves as an executive officer for the U.S. Army in West Germany. . . . . **Richard Carpenter** is a senior project engineer at Hamilton Test Systems, Tucson, Arizona.

Jayne Franciose holds the post of biomedical engineer at the Hospital for Special Surgery in New York City. Last year, she received her MS from WPI. . . . . **John Freeburn, Jr.** works as an electrical design engineer at Coulter Biomedical in Concord, Mass. He and Mary reside in Cherry Valley.

Peter Gibbons is employed as a development engineer at McLaren Engines, Livonia, Michigan. . . . . **Jeffrey Hovhanesian** is employed at the Naval Underwater Systems Center in New London, Conn. . . . . **William Kaknes** is a graduate student and teaching assistant in the Department of Mathematics and Statistics at the University of Massachusetts, Amherst.

Dennis Kelly works for Bechtel Corp., Gaithersburg, Md. . . . . **Bob Kerry** works as a project engineer for the Professional Services Group in Forestville, Md. He is involved in sewer system evaluation surveys and flow monitoring programs in Washington, D.C., Virginia, and Maryland. . . . . **Francis Luttazi** works as a structural engineer at Camp Dresser & McKee, Boston.

Stephan Mezak is now manager of software development for Compact Engineering-Comsat, in Palo Alto, Calif. . . . . **Rory O'Connor** is a senior software editor at Computer Business News in Palo Alto, Calif.

. . . . **Robert Pierce, Jr.** continues as an associate engineer at Babcock & Wilcox, Barberton, Ohio. . . . . **Wiebe Postema** still works with Rockwell International as a member of Technical Staff II on components related to energy production.

Robert Raslavsky now serves as a transportation planner in the Anne Arundel County planning and zoning office in Annapolis, Md. Formerly, he was pedestrian safety coordinator for Baltimore City. . . . . **Kenneth Rass** works as a shift technical advisor at Mississippi Power & Light in Port Gibson, MS. He and Susan have two children and reside in Vicksburg.

Newell Stamm, Jr. recently moved back to Connecticut to join the family business, Stamm Construction. He is chairman of continuing education for the Connecticut section of the ASCE. . . . . **Dan Tarpley** is a marine engineer at Bath Iron Works, Bath, Maine.

Currently, **Bettina Tuttle** serves as a research engineer at Exxon Research & Development Laboratories in Baton Rouge, La. . . . . **Wesley Wheeler** is returning to Florham Park, N.J. to work for Exxon Research & Engineering Co. after completing two years in London. He was responsible for preliminary project planning and contractor followup for ESSO refinery projects in Europe.

Steven Wolfe is an O.S. engineer at HDS Research in San Carlos, Calif. Last year he received his MS in computer science. . . . . **Randall Wyatt** is an application engineer at GE in Schenectady.

Sandra Wyman has joined Air Products and Chemicals, Inc. in Allentown, Pa., where she is a development engineer in the applied R&D group. . . . . **Greg Yeo** works for Exxon Chemical Co., Florham Park, N.J. He and his wife reside in East Hanover.

1979

In January, **John Arnold** joined Digital Equipment Corporation as a programmer-analyst in the Distribution Systems Group located in Northboro, Mass. . . . . **Stephen Clarkin** is a project engineer for Exxon Chemical Co., Florham Park, N.J.

Richard Durand, Jr. is a second-year graduate student pursing his PhD in chemistry at California Institute of Technology in Pasadena. . . . . **Mary Farren** is studying for her MBA at Union College. . . . . **Eugenia Fernandez** works as a technical representative II for Kemper Group in Southfield, Mich.

John Fitzgerald is a self-employed engineer with Erin Associates in Shelton, Conn. . . . . **Michael Foisey** is a wastewater consultant at the Providence wastewater treatment plant, affiliated with Charles J. Krasnoff & Associates, Providence, R.I. . . . . **Robert Hart** serves as a sales engineer at Trane Co., City of Industry, Calif. He is chairman of the Los Angeles Junior Chamber Pro-Star's basketball committee.

Paul Henderson, who is married to Lisa Rawstron, daughter of William Rawstron, '57, is a research and development engineer at Raytheon Co., Equipment Division, Wayland, Mass. . . . . **James Hosford** works for Western Electric in Allentown, Pa. . . . . **Christine Ingalls** works as a junior analysis engineer at ITT Grinnell in Providence, R.I.

Joseph Kintz is employed as a staff metallurgist at Mass. Materials Research in West Boylston, Mass. . . . . **Robert Lamoureux** holds the post of vice president of engineering at Omni Computer Resources, East Providence, R.I. . . . . **Henry Lapa** is presently a student Naval flight officer in Pensacola, Fla.

In April, **James Miller** received his MSEE from Stanford University in California. Presently, he is a member of the technical staff at TASC, Reading, Mass. . . . . **Peter Morico** is employed as a components engineer at Hughes Aircraft in Culver City, Calif. . . . . **Stephen Olson** is an associate engineer for Thiokol Corp. in Promontory, Utah.

John Osborne is concerned with marketing at GE in Roanoake, Va. . . . . **Stephen Prawdzik** works as a sales engineer for GE in Denver. . . . . **Maria Rico** is a graduate student in biomedical engineering at WPI.

Formerly with Texas Instruments in Houston, **Glenn Robertson** was recently promoted to senior engineer at National Semiconductor in Salt Lake City, Utah. . . . . **Thomas Soszynski**, a pilot with the USAF, is being assigned to Plattsburgh AFB, N.Y. in July. Last March, he received his aeronautical rating at Columbus AFB, Miss.

David Tellier works as an estimator-project manager at AC and S Contracting in Wethersfield, Conn. . . . . **David West** holds the post of assistant track supervisor at Conrail. He is located in Rutherford, N.J. . . . . **Karen Wright** is employed as a software engineer at Simmonds Precision, Inc., Vergennes, Vt.

1980

►**Married: Michael T. Bergeron** to Kathleen M. Flanagan on May 2, 1981 in Barrington, Rhode Island. The bride has a degree in social service from Becker. She is employed by the Old Grist Mill Tavern. The bridegroom is with Leominster Tool Company, Inc. . . . . **Constance P. Creedon** and Robert J. Bartelson in Worcester on December 27, 1980. Mrs. Bartelson holds a degree in counseling from Worcester State College and a master's degree in mathematics from WPI. She is a mathematics teacher at Shrewsbury Senior High School. The bridegroom has a master's degree from Worcester State, and also studied at Holy Cross, Newton College of the Sacred Heart, and Clark University. He teaches science at Medway High School.

neer at E.D.S. Nuclear, a subsidiary of Impell Corp., San Francisco.

Ethan Luce is employed as a design analysis engineer at Sikorsky Aircraft, Stratford, CT.

Brian McLane works as a design engineer at Lexidata Corporation in Billerica, MA.

Jennifer Pollard is an assistant civil engineer for the New York State Dept. of Transportation.

Stephen Superson is a design engineer for Teledyne Engineering Services, Waltham, MA.

Gary Sylvestre serves as a project manager at Barclay's American Business Credit, Inc., East Hartford, CT.

Jeffrey Wakefield is product manager at Data Terminal Systems, Maynard, MA.

1979

MARRIED: **Gary Doyle** and Janet Stark last September. Both are senior associate engineers at IBM in Essex Junction, VT. . . . **Earl B. Ingham** and Cheryl L. Nugent on January 9, 1982 in Granby, MA. The bride, an ophthalmic technician for Dr. Robert Donohue, graduated from Holyoke Community College. Earl is employed by Aetna Life and Casualty Co., Springfield, MA. . . . **George R. Tompsett, III**, and Carla Ann Ranney in Broad Brook, CT, on April 24, 1982. Mrs. Tompsett graduated from Windsor Locks High School and is an operations clerk for Hamilton Standard Division of United Technologies, Windsor Locks, CT. George is a process and methods engineer at Hamilton Standard.

BORN: to Andrea and **William R. Herman** a son, Bryan William, on March 31, 1981. Herman is now a senior staff member at Arthur Andersen Company, Hartford, CT.

Jeff Boike continues as a manufacturing process engineer at UOP in McCook, IL. He and his wife, Mary Lynn, reside in Hinsdale.

Glenn Braunstein holds the post of development engineer at Goodyear Tire & Rubber Co., Akron, OH.

John Donahue is employed as an electric studies engineer at Niagara Mohawk Power Company, Syracuse, NY.

Donna Graves is systems marketing manager at Digital Equipment Corp., Merrimack, NH.

Bruce Jenket, who was promoted to lt.j.g. last November, has returned from deployment in which he visited Japan, Guam, Hong Kong and the Philippines. Currently he is an assistant in the Reactor Controls Division of the U.S. Navy, stationed at Pearl Harbor.

Donald Larson works as a product marketing specialist at GCA Corporation. He is located in Bedford, MA.

Jeff Mills designs oil refineries for UOP, Inc. He resides near Chicago.

Gary Pearson serves as New England sales representative for Priam Corporation of Needham, MA.

Ronald Roth is employed as a product engineer at Honeywell in Lexington, MA.

Lt. **Jason Tuell** serves as a numerical prediction meteorologist for the USAF at Offutt AFB, NE.

George Wespi continues as an associate engineer at Riley Stoker Corp., Worcester.

Priscilla Young is studying for her master's degree in environmental engineering at Cornell University.

1980

MARRIED: **Robert W. Dreyfoos** and Martine B. Vray in Worcester on September 26, 1981. Mrs. Dreyfoos, a graduate of Worcester State College, is an inspector for the Palm Beach (FL) County Health Department. He is a design engineer for Photo Electronics Corp., West Palm Beach.

Mihran Aroian is a research technician at WPI.

Theodore Crowley holds the post of manager of language products at C.S.P. Inc., Billerica, MA.

David Fox works as a software engineer at Digital Equipment Corp., Merrimack, NH.

Currently, **Richard Goldman** is a student at the University of Connecticut School of Law in West Hartford.

Michael Herberg continues with GE in Schenectady. Earlier he had been assigned to the Waterford plant.

Arthur Huggard, process engineer at Monsanto Plastics & Resins, Springfield, MA, recently received the Monsanto Employee Achievement Award.

Stephen Kmiotek is a chemical engineer at Cabot Corp. He is located in Billerica, MA.

Kenneth Mandile holds the position of vice president at J.B.M. Swiss Screw Co., Inc., Waltham, MA.

John Roche, still with Micro Networks, is now thin-film engineering supervisor at the Worcester firm.

Doreen Savieira holds the post of planning engineer at Western Electric Co., North Andover, MA.

Jeffrey Smits continues as a member of the technical staff at Bell Labs in Holmdel, NJ.

Mike Stone continues as associate editor of **Car & Driver's Buyers Guide** and **Cars** magazine. He is also vice president of TMS Computer Services and the author of two books: **Mopedaller's Handy Manual** and **Your Four**, a guide to four-cylinder motorcycles. The Stones reside in Danbury, CT.

David Sulkin serves as a design engineer at Hamilton Standard, Windsor Locks, CT.

James Torrey, Jr., serves as a maintainability engineer at Digital Equipment Corp., Marlboro, MA.

Marianne Wessling continues as a doctoral candidate in the department of biophysics and theoretical biology at the University of Chicago.

Lisa Wylie is a staff member at Western Electric Co., North Andover, MA.

1981

MARRIED: **Richard F. Condon, Jr.**, and Linda J. Michaud in Townsend, MA, on April 24, 1982. Rich is a photographic engineer at Kodak, Rochester, NY. . . . **David R. Lamborghini** to Helen Aadland in Fairhaven, MA, on January 9, 1982. Mrs. Lamborghini graduated from Fairhaven High School. David is with Procter & Gamble, Quincy. . . . **Steven M. McDonald** and Pamela J. Loftus on January 16, 1982 in Worcester. The bride is a student at Becker Junior College. Steve is with Data General in Westboro. . . . **Joseph P. Norman, III**, and Susan A. Bish in Springfield, MA, on December 27, 1981. The bride has an AS degree in medical assisting from Becker Junior College. Joe is a structural engineer at McDermott, Inc., New Orleans, LA. . . . **Scott A. Sargis** and Karen L. Richardson in Leominster, MA, on February 5, 1982. Mrs. Sargis graduated from Becker. Scott is a mechanical engineer with Chevron Chemical Corp. in New Orleans.

Anthony Cabral is a student at Carnegie-Mellon University, Pittsburgh, PA.

Cindy Canistro works as a project engineer at GE Plastics in Pittsfield, MA.

James Connor is a sales engineer for Advanced Micro Devices in Sunnyvale, CA.

Dan Doherty, Jr., works as a senior technical marketing specialist at Digital Equipment Corp., Marlboro, MA.

Ethan Foster holds the post of programmer/analyst at the Laboratory of Computer Science, Massachusetts General Hospital, Boston.

Currently, **James Geib** is a design engineer at Winchester Electronics. He is located in Watertown, CT.

Robert Hess has joined the Methods/Facilities Branch in the Production Department, Department of the Navy, Norfolk Naval Shipyard, Portsmouth, VA.

Peter Hinckley has been employed as a product engineer at The Torrington Company, Torrington, CT.

Keith Mazzarese works as a field engineer for Stone & Webster in Waterford, CT.

William Miller holds the post of sales engineer at Westinghouse Electric in Framingham, MA.

David Oriol is now an associate at Manufacturer's Business Systems, Inc., Worcester.

Frank Polito is part of the technical staff assigned to the digital lines department at Bell Laboratories, North Andover, MA.

Timothy Shea works as a scheduling engineer for Crawford & Russell, Inc., of Stamford, CT.

Jeffrey Smith is a planning and systems analyst-manager at Dresser Atlas in Houston, TX.

Peter Tiziani is a design engineer for Combustion Engineering in Windsor, CT.

David Valardi serves as a field engineer at Dresser Atlas in Rayne, LA.

Robert Wright holds the post of assistant engineer at New England Power Service Company in Worcester.

School of Industrial Management

Clifford Pontbriand, '58, continues as manager of frame operations at Pennsylvania Optical Co., Reading, PA. . . . **William Barlow, '65**, has been elected executive vice president at Wyman-Gordon in Worcester. He joined the company in 1943 and has worked in engineering, manufacturing and senior management jobs. . . . **Leo St. Denis, '65**, has been promoted to manager of quality control at Anderson Operations-Bay State Abrasives Division, Worcester. He has an associate's degree in mechanical engineering from Worcester Junior College. . . . **Ernest Anger, Jr., '78**, has been appointed manager of system development at Bay State Abrasives Division, Dresser Industries, Westboro, MA. He graduated from Wentworth Institute and joined Bay State in 1958 as an engineering technician.

Natural Science Program

In January Worcester State College physics professor **Robert Kelley, '60**, courtesy of the U.S. Navy, joined 36 college instructors from all over the country at Cape Canaveral to get a firsthand look at the "new nuclear Navy." One of the highlights of the visit was an opportunity to witness a simulated missile launch from a nuclear-powered submarine. . . . **Ralph Southwick, '66**, teaches science at Jefferson (MA) Middle School. . . . **Philip Wilson, '78**, continues teaching at Lynnfield High School, Lynnfield, MA. . . . **William Johnson, Jr., '81**, is a teacher at Rockport High School, Rockport, MA.

COMPLETED CAREERS

David E. Carpenter, '11, of Agawam, MA, a long-time employee of Westinghouse, died on April 1, 1982 at the age of 93.

Except for four years with Buckeye Products, Mr. Carpenter was with Westinghouse Electric Corp. from 1911 until his retirement. He earned the company's highest honor, the Silver "W" Order of Merit, and held a patent on a winding machine to automate the winding of motor stators and rotors. In 1955 he retired as a consulting manufacturing engineer.

A. Hugh Reid, '11, of Worcester, class vice president, passed away recently.

He was born on July 7, 1889 in Worcester. Graduated from WPI as a mechanical engineer, he was retired from CF&I Steel Corp. and belonged to the Tech Old Timers and Sigma Xi.

Alfred R. Kinney, '12, of Blacksburg, VA, a long-time employee of the U.S. Forest Service, died February 3, 1982. He was 92.

A Worcester native, he received a BSCE from WPI. During his career with the U.S. Forest Service, he served as examiner of surveys in West Virginia, Virginia and Pennsylvania and as chief land examiner in the Unaka and Pisgah National Forests situated in Virginia, Tennessee and North Carolina.

Roland H. Dufault, '14, of Wellesley Hills, MA, president of the Class of 1914, died on January 31, 1982.

"Mike" graduated with his BS in chemistry from WPI, then worked for three years at J. Russel Marble & Co., Worcester. During World War I he was a major in the U.S. Army. From 1919 until 1953 when he retired as branch manager in New York City, he was with du Pont.

He had been a member of the New York Board of Trade, the Chemists Club of New York, Tau Beta Pi and Sigma Xi. A native of Spencer, MA, he was 89. He was a former WPI Alumni Council representative from Philadelphia and a member of the Tech Old Timers.

William J. Becker, Jr., '15, of Kansas City, MO, passed away recently. He was 89.

During his career, he was employed by Butterworth Judson, Midwest Refining Co., General Engineering and Maintenance Corp. and Trojan Engineering Corp. From 1932 until he retired in 1957, he was with Long Island Lighting Co., where he rose to superintendent.

Mr. Becker, a Mason, was also a past president of his local Rotary Club. For 15 years he was active with the BSA, advancing to district director. He belonged to Theta Chi and was a World War I Army veteran.

Simon Collier, '16, a retired executive from Johns-Manville Corporation and resident of Los Angeles, passed away in December.

Following his graduation as a chemist from WPI, he joined the Boston Belting Company. Later employers were the National Bureau of Standards, Washington, DC, Johns-Manville, from which he retired as director of quality control in 1959, and UCLA, where he was an associate professor-lecturer. A nationally known authority in the field of industrial quality control, he specialized in quality control consulting in asbestos fiber and products. Papers on his specialty were published in various professional magazines.

Mr. Collier was born on June 1, 1894 in Salem, MA.

Edwin W. Bemis, '19, of Brick Town, NJ, died recently.

After graduating as an electrical engineer, he did part-time graduate work at WPI. From 1920 to 1962 he was on the headquarters staff at American Telephone & Telegraph Co. He joined ITT in 1962 and retired in 1968.

Mr. Bemis was born July 19, 1897 in Holyoke, MA. He was a senior member of IEEE and belonged to Tau Beta Pi and Sigma Xi. He served as secretary of the Class of 1919. He was a former secretary of the New York Chapter of the WPI Alumni Association.

Roy H. Carpenter, '19, of Wooster, OH, died on July 4, 1981.

He was born on September 11, 1897 in Warren, MA, and graduated with a BS in chemistry. In 1929 he received his MA from Columbia University.

After teaching in several high schools in Maryland, Massachusetts and Connecticut, he taught at Ossining (NY) High School from 1929 to 1945. From 1945 to 1964, when he retired, he was principal at Roosevelt School in Ossining. Mr. Carpenter belonged to the Masons and to the Ossining Board of Education.

Dana D. Goodwin, '19, of Fitchburg, MA, the retired president of W. C. Goodwin, Inc., died April 17, 1982.

A Fitchburg native, he was born on October 5, 1897 and later studied electrical engineering at WPI. During his career, he was affiliated with the Rock Island (IL) Arsenal and Simonds Mfg. Co. For many years he was the self-employed president of W. C. Goodwin, Inc., a retail shoe store in Fitchburg.

Mr. Goodwin belonged to Phi Sigma Kappa and the Masons. He was a former vice president of the Worcester County Alumni Club of the WPI Alumni Association.

Arthur W. Bassett, '20, of Lititz, PA, passed away on January 29, 1982.

In 1962 he retired as chief of power engineering at Armstrong World Industries, where he had been employed since 1929. Previously, he was with Pennsylvania Power and Light Co. and New Jersey Zinc Co.

He was born on January 4, 1897 in Heath, MA, and received a BSME from WPI. He belonged to the Masons, the Shrine, the National Association of Professional Engineers and Sigma Phi Epsilon. Formerly he served as president of the local chapter of the American Business Club.

David W. Dimmock, '22, died Christmas Day at his home in Hatchville, MA, following a long illness. He was 80.

Before retiring in 1959, he taught mathematics in the Falmouth school system for 15 years. For 40 years he operated a farm in Hatchville. He was born on February 21, 1901 in Pocasset, MA.

Austin J. Ball, '25, died March 9, 1982 in Hackettstown, NJ, at the age of 78.

A native of Clinton, MA, he was born on May 28, 1903. In 1925 he graduated as an electrical engineer from WPI. For many years he was employed by Consolidated Edison of New York City. He retired in 1975.

John J. McAuliffe, '25, of Walnut Creek, CA, passed away recently.

A native of Massachusetts, he was born on January 31, 1903. He graduated from WPI as an electrical engineer. For a number of years he was with General Electric in Schenectady, NY, and Westinghouse in Sunnyvale, CA. At his retirement he was an operations analyst at Stanford Research Institute in Menlo Park. He belonged to ATO and Skull.

Theodore D. Schoonmaker, '26, of Northboro, MA, a retired sales manager for Massachusetts Electric Co., died on February 16, 1982 in Marlboro Hospital. He was 79.

Following his graduation as an electrical engineer, he joined Malden Electric Co. From 1940 to 1944 he was an appraisal engineer for the North Central District of the New England Electric System. Later he was associated with the power sales department and then became commercial sales manager. He retired from Massachusetts Electric in 1967.

Mr. Schoonmaker was a member of the Masons, Trinity Church (former deacon) and the Tech Old Timers. He had served on the Municipal Code and Bylaw Committee of Northboro. He was the father of **Paul Schoonmaker, '56**, and was born on February 18, 1902 in Hyde Park, MA.

Albert A. Baron, '30, a retired manager for U.S. Envelope Co., died on March 16, 1982 at his home in Alhambra, CA.

He joined the Kellogg Division of U.S. Envelope in 1929 and was made plant manager in Springfield, MA, when the plant had over 1000 employees. He also was plant manager in Atlanta, GA, and Worcester and had been production control manager for the firm in Los Angeles, as well as western region sales representative.

Mr. Baron, a member of AEPi, was born March 10, 1907 in Bristol, RI. He received his

Clarence A. R. Lundquist, '23, a retired general superintendent of Thompson Wire Co., died in St. Petersburg, Florida on October 7, 1980.

After receiving his BSME in 1923, he joined Wickwire Spencer Steel Corp. as department superintendent. From 1925 to 1961 he was general superintendent at Thompson Wire Co., Worcester.

He belonged to the Worcester Engineering Society, the North Worcester Aid Society, the Masons, and the Elks. A native of Worcester, he was born on June 1, 1901.

Clarence E. Anderson, '24, died in Charlottesville, Virginia on April 16, 1981.

In 1965, he retired as general sales manager of the Virginia Electric and Power Co. He began in 1926 as the business manager for Virginia Public Service. When that company merged with Virginia Electric and Power Co. in 1944, he became the director of commercial and industrial sales for the company's western and northern divisions.

After serving as a systems director in Richmond, Va., in 1956 he became manager of sales promotions. Later, he was made general sales manager. Early in his career, he had been with GE and Consolidated Power & Light.

Mr. Anderson was born on July 23, 1900 in Worcester, and belonged to Phi Sigma Kappa. At one time, he was vice president of the Washington chapter of the WPI Alumni Association.

Kenneth G. Broman, '25, of New Boston, New Hampshire died on April 5, 1981.

He was a member of the Class of 1925. During his career, he was with Matthews Mfg. Co., Worcester, and Miniature Precision Bearing Co., Keene, N.H.

Merle E. Hutchins, '25, died unexpectedly while visiting in San Francisco, California on May 7, 1981.

He was born on Jan. 28, 1903 in Haverhill, Mass. In 1925, he graduated as a mechanical engineer from WPI. From 1926 to 1934 he was a metallurgist for the Aluminum Co. of America, New Kensington, Pa. He was then chief metallurgist for Mirro Aluminum Co., Manitowoc, Wisc., from which he retired in 1968.

Active in Masonic work, he was thrice illustrious master, an eminent commander, and a recipient of the Honorary Degree, Knights of the York Cross of Honour. A Royal Arch Knight Templar Priest, he wrote a book about his local lodge, *A Century of Masonry (1856-1956)*. He belonged to Theta Chi. In 1926, he received his MS from MIT.

John S. Miller, '26, passed away in Torrington, Connecticut on May 17, 1981. He was 77 years old.

During his lifetime, he was employed by the New York, New Haven & Hartford Railroad and the Alfred B. King Steel Erectors Co. in New Haven. Prior to his retirement, he had been assistant manufacturing manager in the bearing division of The Torrington Co.

Mr. Miller was born on April 20, 1904 in Worcester, and graduated with his BSEE in 1926. He was a former director of the United Way and the Torrington Country Club, as well as treasurer of the Northwestern Connecticut Girl Scout Council.

Clarence W. Titus, '28, a retired chemical engineer, died March 4, 1981 in New Haven, Connecticut at the age of 75.

He was born on Jan. 5, 1906 in Morris, Conn., and later became a member of the WPI Class of 1928. Before retiring in 1968, he had been chief engineer with the former Connecticut Koppers Coke Co. for over 40 years.

Mr. Titus belonged to the Republican Town Committee, the Congregational Church, and the National Grange.

Carl F. H. Au, '29, of Fort Lauderdale, Florida died of a heart attack on October 12, 1980.

A Worcester native, he was born on June 6, 1903. After graduating as a mechanical engineer, he worked for W. & L.E. Gurley, then Carl H. Au & Son. From 1931 to 1960, when he retired, he was with the U.S. Department of Defense in Washington, D.C.

Clyde T. Smith, '30, of Santa Rosa, California died on January 6, 1981.

A native of Rahway, N.J., he was born on April 2, 1907, and in 1930 received his BSME from WPI. For four years, he traveled for Conde Nast selling a new trade and fashion service to leading department stores throughout the country, and subsequently became a management specialist. At one time, he was associated with B. Altman in New York, as well as with Emerson Engineers, where he was a consultant.

Eventually, he became shift engineer, then a radio transmitter engineer for RCA Global Communications in Rocky Point, N.Y. In 1972, he retired from RCA.

A member of SPE and The American Marketing Association, Mr. Smith also belonged to the Toastmasters' Club. Hobbies included a part-time vending business, stock and commodity trading, and sailing.

Francis M. Sullivan, '32, a research chemist who perfected vegetable oils, died in Wilmington, Delaware on April 27, 1981 at the age of 71.

His career centered upon chemical and engineering research, desisn and development. Major contributions included advances in technology of the processing of vegetable oils for conversion to food products, while he was with Lever Bros. Co. and developments in the manufacture of Vitamin B1 and Vitamin C, while with Hoffman LaRoche, Inc.

Other firms with which he was associated were Allied Chemical Corp., du Pont, and Robertshaw Controls. After retirement, he was a self-employed consultant. He was a member of the AICHE, American Chemical Society, National Society of Professional Engineers, and Phi Kappa Theta.

He was born in Springfield, Mass. on March 15, 1910. In 1932, he received his BS in chemistry from WPI, and in 1933, his MS from MIT. He was a former president of the northern New Jersey chapter of the WPI Alumni Association.

Robert C. Stickle, '38 of Parma Heights, Ohio passed away on February 11, 1981.

In 1938, he graduated as a civil engineer. His employers included Florence Stove Co., Niles (Ohio) Rolling Mill Co., and the Dow Chemical Co., Midland, Mich. At Dow, he progressed from junior engineer, to senior design engineer, then to project engineer in the engineering section.

He belonged to the NSPE, Midland Engineering Society, and the Society of American Military Engineers. He was born on Jan. 31, 1917 in Brooklyn, N.Y.

Harold L. Crane, '42, a former aeronautical engineer from NASA's Langley Research Center, died in Hampton, Virginia on January 20, 1981.

He retired in the fall of 1980, having completed 38 years at NACA-NASA. He worked in the stability and control section of the Flight Research Division and was responsible for handling qualities studies on a number of World War II fighters and bombers. Most recently, he was concerned with instrument flight studies on general aviation aircraft. His own experience as a private pilot helped him evaluate the problems encountered.

Mr. Crane enjoyed running and completed two half marathons last year. He competed in and ran many model airplane events. He also played golf, sang in the Methodist Church choir, and played the piano in the Men's Bible Class for 25 years.

He belonged to AIAA, the Academy of Model Aeronautics, SPE, and Sigma Xi. A Worcester native, he was born on Aug. 8, 1920. In 1942, he received his BSME from WPI.

James M. Fernane, '42, died February 16, 1981 at his home in Washington, D.C. He was 63 years old.

From 1942, until he retired in 1976, he served as an electrical and radio engineer with the Federal Communications Commission in Washington. He was a charter member of the Washington YMCA and a life member of the American Legion and the Rifle Association of America.

He was born on December 11, 1917 in Worcester. In 1942, he received his BSEE from WPI. A World War II Navy veteran, he belonged to the Veterans of Foreign Wars. Also, he was a member of the National Society of Professional Engineers, Aircraft Owners and Pilots Association, the Elks, and the Knights of Columbus.

Dr. Raymond Wynkoop, '42, a former director of corporate research at Sun Oil Co. of Philadelphia, passed away at his home in West Barnstable, Massachusetts on March 12, 1981.

After graduating as a chemical engineer from WPI, he subsequently received his doctorate as a Shell fellow from Princeton in 1948. He belonged to SAE, Tau Beta Pi, and Sigma Xi. Also, he was a member of the American Association for the Advancement of Sciences, the ACS, and the Society of Auto Engineers, among others. He was past president of the Philadelphia Harvard Business School Club.

On the Cape, he belonged to the Barnstable Radio Club, the Harvard Club of Cape Cod, and the Museum of National History.

During his career, Dr. Wynkoop was with Publicker Industries of Philadelphia; S. D. Hicks & Son Co., Boston; and Tufts College, Medford, where he was an associate professor. He attended DePaul University Law School at night and completed all of the degree requirements except for the final dissertation. Later, he attended Harvard University as a member of the Advanced Management Program.

In 1958, he joined Sun Oil, after having served as assistant to the president of the former Houdry Process Corporation and as manager of sales for Catalytic Construction Company. He had also been with National Distillers and Chemical Corporation and Standard Oil.

While with Sun Oil, he was assistant director of Petrochemicals and retired as director of corporate research, moving to Cape Cod in 1977. He was born on Aug. 3, 1916 in Bethayres, Pa.

Lawrence F. McNamara, '43, a former president of Firematic Sprinkler Devices of Shrewsbury, Mass., died in Naples, Florida, on December 20, 1980.

A Worcester native, he was born on July 3, 1920. He received his BS in chemical engineering in 1943. During his career, he was with Rockwood Sprinkler of Worcester, forerunner of Firematic Sprinkler, which he later served as president. He owned Astra Sprinklers, Ltd., of Sherbrooke, Quebec, and Guardian Automatic Sprinkler Co. of Nashville, Tenn.

Mr. McNamara beloned to Phi Kappa Theta and was a past president of the Lions Club. He was a registered professional engineer in Massachusetts. A veteran of World War II, he was an Army Air Force intelligence officer. He was a former veterans' service officer in Leicester, Mass.

Peter E. Talley, '44 of Pocono Summit, Pennsylvania, passed away recently.

He was born in Wilmington, Delaware on Oct. 6, 1921. In 1944, he received his BS in chemical engineering from WPI. He had previously attended Lafayette. For many years, he was a salesman for du Pont.

Clinton C. Boone, '46, an international utility consultant with Ebasco Services, Inc., for the past 33 years, died of heart failure on February 7, 1981 in New York.

Boone, a member of the Class of 1946, graduated from Yale University in 1947 and received his master's degree from New York University. He also attended Brown University and the Polytechnic Institute of Brooklyn.

He was born April 7, 1922 in Brooklyn, N.Y. A volunteer for service in World War II, he was assigned to motor torpedo boat duty in the Atlantic. He was promoted to radioman first class, selected for officer's training, and served in the Navy V-12 until 1946.

While employed as an engineering consultant for Ebasco, he traveled to Turkey, Greece, Venezuela, and throughout the U.S. He belonged to Phi Sigma Kappa.

Nestor Brown, Jr., '46, a 26-year employee of Carrier Air Conditioning Corp., passed away on February 3, 1981 at his home in East Syracuse, New York. He was 56 years old.

A native of Springfield, Mass., he was born on Oct. 10, 1924, and later received his BSME from WPI. He attended Columbia University. From 1946 to 1954 he was with the Van Norman Co. in Springfield. After serving in the Navy in World War II, he joined Carrier. At the time of his death, he was manager of the Engineering Systems Division. He belonged to Lambda Chi Alpha and the ASHRAE.Normand R. Poirier, '48, a veteran journalist, died in New York City on February 1, 1981 following a two-month illness. He was 53 years old.

He was born in Worcester on April 14, 1927. He attended WPI until his education was interrupted for Navy cadet pilot training. For a time, he was a reporter for the Worcester Telegram and Gazette. Later, he graduated from Cornell. In 1950, he began work as a publicist in Los Angeles. Then, he was a reporter for newspapers in Lafayette, La., Pottstown and Reading, Pa., before joining the New York Post in 1961.

Mr. Poirier also wrote for *The Saturday Evening Post*, *Look*, and *Esquire*. At the time of his death, he was a copy editor for Newsday, the Long Island daily. He was a member of Phi Kappa Theta.

William T. Mehalick, '52, died at his home in Orange, Texas on February 9, 1981.

After graduating as a mechanical engineer, he joined du Pont, where he spent his career. He had been foreman, supervisor, and area supervisor for the company. One of his last assignments was with the Sabine River Works.

He belonged to Phi Kappa Theta and Skull and had served with the U.S. Navy. A native of Elmira Heights, N.Y., he was born on June 4, 1927.

David A. Helman, '58, was stricken and died April 30, 1981, while leaving work at his San Francisco office.

He was born on Aug. 12, 1936 in Pittsburgh, Pa., and graduated as a mechanical engineer in 1958. During his career, he was with Sperry Gyroscope, the U.S. Army, Jamesbury Corp, the Torrington Co., and Applied Radiation Corp. At the time of his death, he was the vice president for administration for the Institutes of Medical Sciences in San Francisco. He was a member of SPE.

John F. Highman, '76 was killed in a one-car accident in Holliston, Massachusetts on March 17, 1981, when his car struck a tree. Three years ago, his brother, Henry, was also killed in a similar accident on the same street.

Born in Framingham, Mass. on Sept. 1, 1954, Highman later attended WPI. In 1976, he received his MSCS with distinction. During his career, he was a systems assistant at Travelers Insurance in Hartford, Conn., and an assembly language programmer at Analogics, Inc. in Wakefield, Mass. He belonged to Phi Kappa Theta and Tau Beta Pi.

Notes from the editor

SEVERAL SHARP-EYED READERS have written in to comment on the cover of the Winter issue of the *Journal*, a photograph which was identified as a snow scene near Higgins House. It was, of course, nothing of the kind. It was a snow scene near Skull Tomb.

A word about typographical errors:

OVER THE COURSE of the last year and a half, typesetting of the *WPI Journal* has been transformed, from the traditional "send the raw manuscript copy off to the printer" to the point where now virtually all copy is directly input by Journal editorial staff on a word-processing computer located in the University Relations Office. Typesetting codes are inserted, the floppy disk is sent off, and the *Journal* copy is directly converted to typeset output.

However, at the time we changed our procedures we inadvertently eliminated one very important proofreading step right at the end. Most of the time, little harm was done, but the mistake finally caught up with us in the course of producing the Spring issue of the *Journal*. Far too many errors crept in, and they were either not caught or not corrected. Apologies are especially due TECH OLD TIMERS, because the article on their organization contained an egregious number of errors.

In the wake of that typographical disaster, new procedures have been installed so that we do not overlook proofing a piece of copy. My sincere apologies to all those who were affected by the errors.

—Russell Kay

HOMECOMING 1981 October 2-3

Friday, October 2:	Evening Concert
Saturday, October 3:	
morning	Atwater Kent open house, tours, and Rededication
	Reunion Brunches—Classes of 1966, 1971, 1976
	WPI Alumni Soccer Game
	WPI Alumni Crew Race
afternoon	Tailgate picnic and barbeque
	Varsity Football—WPI vs. Colby
	5th Annual Alumni Road Race
	Rope Pull
evening	Happy Hour for Alumni and friends at Higgins House Concert
	Night Club Entertainment in Harrington Auditorium

HOMECOMING 1981

Fall 1981

WPI journal

GORDON LIBRARY

Editor: In your recent survey of alumni, I indicated a superior rating for Tech's publications. The most recent publication with a featured article on a so-called "inventor" appalled me.

In my opinion, the article was an expose of a patent seeker. As a holder of world-wide patents for basic high speed taping systems mainly used in the wire industry, it is repugnant to me to denigrate the role of a true inventor whose patented achievements sufficiently add to the world's technology base to warrant acceptance of royalty based licences throughout the world.

Your article, again, in my opinion, did an extreme disservice to engineering students and young graduate engineers. While there certainly is a warranted historical place in industry for leisure games, and fine national and foreign firms enjoy large markets for such products, most electronic games and toys are seemingly more representative of marketing applications of various assemblies and packaging of basic components wherein the fundamental technology, or inventiveness exists.

Finally, what especially exasperates me is my view that the entire article could be construed as a sales pitch for the author's planned new endeavors.

Constructively, please consider a future article based on the contributions Worcester Tech alumni true inventors have added to the world's technology base. A little research will give you quite a list.

—John M. Townsend, '42
Guilford, Connecticut

Trustee nominations sought

Every year, the WPI Alumni Association has the opportunity to nominate three alumni to serve as alumni term members of the WPI Board of Trustees. Paul W. Bayliss, '60, of Barrington, Ill., chairman of the Association's Trustee Search Committee, announces that the committee is now receiving petitions for consideration and nomination for 8-year terms beginning in July 1982.

1982 marks the second year of transition to the new 8-year alumni trustee term. Two trustees, Len White, '41 and Dick Davis, '53, will be completing their first five-year terms in June 1982. In accordance with the by-laws as revised in June 1980, both have elected to seek second five-year terms and have the recommendation of the Trustee Search Committee of the Alumni Association. Anson Fyler, '45, completes his second five-year term in June 1982 and is not eligible for another term. The Committee will recommend a candidate for an 8-year term to succeed Mr. Fyler.

Until 1989 when the transition to eight-year trustee terms will be complete, the Committee will endeavor to assure that at least one alumni term trusteeship will complete each year thereby assuring regular and orderly introduction of new members to the board under the new term arrangements.

The Committee seeks your suggestions concerning candidates for consideration for alumni trusteeships. Alumni may submit petitions on or before December 1, 1981, and they should be mailed to Mr. Bayliss c/o the WPI Alumni Office, Boynton Hall, WPI, Worcester, MA 01609. Any questions regarding procedures for the formal submission of proposals should be directed to Stephen J. Hebert, '66, alumni secretary-treasurer, at WPI (617-793-5600).

WPIjournal

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An interview with Mechanical engineering professor Ray Hagglund, '56, who has added a second career in the courtoom to his first career in the classroom.

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A profile of the man who has run student activities at WPI for the last decade.

14 **Your class and others**

15 **It's in the bag for him**

31 **Completed careers**

1 **Alumni Association**

1 **Feedback**

Cover: This mysterious-looking photograph of Boynton Tower was taken by Mechanical Engineering technician George Schmidt through a special prism lens.

An important note to Journal readers:

THIS IS THE 48TH and last issue of the *WPI Journal* which will be edited by H. Russell Kay. Russ has submitted his resignation to accept a position with the Computer Security Institute in Northboro, Massachusetts, effective December 1, 1981.

During the past eleven years as Director of Publications at WPI and as editor of the *WPI Journal*, the quality and scope of our college publications has increased immensely. A style has been developed which has been easily recognizable, aesthetically pleasing, and editorially effective, thanks to Russ's careful nurturing of the myriad number of publications he has been responsible for. In fact, during his years at WPI the number of publications he has produced annually has increased from approximately 50 to nearly 300 this past year.

We congratulate and thank Russ for the excellent job he has done for WPI and for the *WPI Journal* and we wish him much success in his new position.

—Donald E. Ross, '54
CHAIRMAN,
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Ray Hagglund:

A WPI asset who's concerned with liabilities . . . product liabilities, that is.

MENTION THE WORDS **products liability** *to someone in the manufacturing industry, and chances are you'll get a reaction of pain and frustration. Although it has been around for quite a while, only in recent years has products liability—what might be called manufacturing malpractice—occupied a prominent place in American civil litigation. Because it is so recent a phenomenon, many engineers and managers don't have much experience to go on, and they have to rely on instinct. That can be a dangerous course of action when entering the territory of the law.*

Mechanical engineering professor RAYMOND R. HAGGLUND, *'56, has more experience in, more knowledge of this new area than most engineers or educators will ever dream of. Hagglund comes at products liability from a unique perspective—the consulting technical expert who testifies in court, a veteran of more than 300 cases in the past decade.*

In the interview which follows, what is perhaps most interesting—even more than some of his "war stories"—is the way in which Hagglund uses his experience to further his teaching at WPI; how he helps ensure that the next generation of engineers will be better able to cope with the legal implications of their professional work.

Q: How did you first get involved with products liability?

I have always been interested in consulting on technical problems, that is, applied problems rather than problems involving pure research. I'm interested in systems, also—not just the calculations for a shaft, but the whole machine. That's just my nature. I handle systems which are interdisciplinary in their nature; I apply a lot of technological knowledge, and where I don't have the knowledge required, of course, I can get someone to consult with me. That's how I like to address problems—wide open. I've always been that way.

I have worked as a consultant since I graduated from WPI in 1956. (Of course, you're kind of limited in what you can do at that point in your career, and people don't call you because you can't do very much, but you're young; you live through it.) But I did find work, and I was successful at it, and I had fun too.

In 1962, another teacher at WPI started a business called Massachusetts Materials Research. I agreed to work with him, and so I got involved with a lot of consulting. There came a time when I had to make a decision, whether to go with the company full-time or stay in teaching. I decided to stay at WPI, and the company hired a technical director. I'm still a consultant to them.

These were mostly quite technical problems that I encountered from 1962 to 1968 or so. A few of these consulting problems involved failure of a machine or an accident, where I had to go to a factory, determine what happened, and make a report (perhaps suggesting a design change)—which would go to an insurance company.

Then a couple of those reports ended up in lawyer's hands too, and I found myself being requested to appear in court. Even though products liability law had been around for a long time, there was very little happening with it until the middle 1960s, when it started to become active. It didn't become a major area of law until the early 1970s, and at that time there were still very few lawyers in this field.

Q: What was your first major products liability case like?

In 1970, I was engaged to look at an automobile that had been involved in a rear-end collision. It was a 1970 Ford Maverick, and it had what is known as a drop-in fuel tank at the rear of the vehicle. The gas tank drops into a hole in the trunk floor and therefore becomes part of the structural strength of the rear of the car. By doing this, Ford saved a piece of metal, which saved some money. But in a rear-end collision, after the bumper gets hit, it doesn't take much to start hitting the trunk floor, which starts squeezing the fuel tank, which then shears, tears, and dumps raw gasoline into the trunk. The filler plumbing is located in the trunk, and that also separates to dump more gasoline into the trunk.

I declared that this was terrible design, and I backed my statement with "state of the art" research that Ford itself had funded in 1967, where they found that this was bad design. Yet three years later they were still making the 1970 Maverick in the old, bad way.

This sat for quite a while, and I didn't think anything more of it. But then, in 1973, it came to trial in Providence, Rhode Island. Suit was filed on behalf of the 16-year old who had died in that accident. This became known as the Turcotte case, and it was the first major trial I was involved in.

I explained to the jury that this particular fuel tank design was bad design, was negligent design. There were experts on the other side saying it wasn't. The jury made a finding for the plaintiff, awarding the estate $500,000. This was an important case, and it hit the newspapers across the country. The case was appealed, and the reviewing judge ruled that the original finding and award would hold. This case set a legal precedent in what is known as "second collision" theory. I made the grand sum of about $300 on that one.

But my name began to be known, and I started receiving phone calls from all over—Virginia, Alabama, Texas—anywhere someone had a similar accident case.

Q: Did all these cases involve Fords?

No, in fact all of these others involved American Motors Corporation Gremlins, which had fuel tank designs that were much worse than the Fords. You know, at one time I got scared; I thought that AMC might put out a Mafia contract on me, because I was involved in so much litigation against them.

The AMC Gremlin had a terrible design. The fuel filler neck is in the back of the car. When the car is hit at 15 miles an hour, the plastic upholstery will pop off and the rubber connection will separate. At a little higher speed, the gas tank gets crushed against the differential, and the nozzle inside the car, pointing forward, will spray gasoline on the driver and the passengers. The wires in the taillight, scraping against metal, will fray and spark. In seconds there will be an explosion and a fire.

Sometime later in my products liability career, I flew down to Alabama to prepare for one trial against AMC. My first job was to gear up the trial attorney. By this time, I knew what the attorney has to do for opening statements and trial organization. I selected,

from material I had brought with me, documents for him to read and burn into his memory. I explained the important pieces of the documents, and then he could decide whether to incorporate that into his opening statements.

On Wednesday, when the trial was proceeding, the defense thought they had me in a corner. I was asked, "Professor Hagglund, you said there was a fire in the vehicle."

I said, "There surely was a fire; some of this material has been damaged."

"But the fire was at the front of the vehicle, wasn't it?"

I said, "No, it was in the rear of the vehicle also."

He continued, "Look at this photograph." It was a picture of the area to the left of the filler neck. "The floor paint isn't even touched by fire. Therefore there could not have been fire there. Would you not agree?"

"No," I said, "that's faulty reasoning. There was a fire above the paint. The fire did not touch the paint. It didn't burn there because there was too much gasoline. The gasoline sloshed over there, and too much gasoline doesn't burn. Flammable vapors have to exist, and that means you have to have a certain proportion of gasoline to air to have a fire. Too much is like a flooded car. When you try to start your car, the engine won't fire. Too little is like an empty gas tank. You have to be in the right range."

My attorneys were shocked. They had never heard this before, and they got scared. They came up to me as the day ended, asking what was I doing?

"You don't understand what I'm talking about, do you?" I replied.

"No way, it couldn't possibly be true. Gasoline burns; everyone knows that."

"Listen," I said back to them. "You're not going to believe what I tell you. Before we do any more work tonight, I want you to get in touch with the local fire marshal. Ask him some questions and see what he says. Then we'll talk."

They did that, and, to their amazement, found out I was right. When they came back, we started work on how to cross-examine the AMC expert. "You have to box him into that same corner," I told them. I laid out the questions they had to ask. We talked and talked, and they couldn't quite grasp everything, but at least they had the questions, the essence of what I was saying. They got the AMC expert on the stand the next day, and they kept working and working on him, and finally, after three hours, got the man to agree with me. At that point the case was settled, instantly.

Q: You do a lot of work with automobile cases. Why is that?

These early cases were automobile-related. Once started in this sort of thing, I became an "expert". I happen to have a keen interest in cars and in working on them; I do all my own car repairs, for example. I understand a lot about automobile systems, and I can match what I see with engineering theory.

Q: In all this work with the legal system, in courtrooms and lawyers' offices, how did you cope as an engineer without legal training?

Because of my courtroom work, I became fascinated with law. I started to collect and read law books, because the lawyers I dealt with were talking a language I didn't understand. What was worse, I didn't understand the logic of what was going on. So I started my own law library in this new field of products liability, reading—with considerable effort at first—all the major books.

Q: Can you discuss a non-automotive products liability case?

I went up to St. Johns, New Brunswick, where the Erving Pulp and Paper Mill had a small pulp mill. (Small in this context means that it only cost $200 million and uses 3,000 cord of wood a day; big ones use 12,000 cord!) This mill had a $30 million boiler that generated steam for the process. In this boiler was an economizer, a section that preheats water going into the boiler. This is a big bank of tubes—two inches in diameter, spaced just one inch apart, jammed together into a small area. The mill was experiencing tube failures, which meant water leaks. In this particular type of boiler, when you have a serious leak you can have a violent explosion which will level the entire building and kill everyone in it. It's important not to have leaks.

Two years after the boiler had been installed, these leaks were now coming once and twice a week. Each time it would take 24 to 48 hours to correct the problem. This meant shutting down the system, finding the leak, cutting away good tubes in order to get to the leaking tube, then rewelding the bad tube and all the ones that had to be cut to get in there. It probably cost the company $250,000 a day, money they could never recover again.

When I was called in to look at this, I made some calculations and determined that the tubes failed in fatigue because of a very sophisticated vibration problem. Gas flow through the tubes was leaving vortices behind each tube—like eddies in a stream—and the vortex frequencies matched the tubes' natural resonant frequency, and also matched the "organ-pipe" frequency across the walls. This created serious vibration, and it stressed the tubes until they started failing.

I was there to solve a problem. There were another 20 people from around the world, who were there not really to solve this problem but to save their asses because they had helped build this boiler which kept leaking.

My work on that case expanded over the next three years. I put together a major report in which I advised the company, on the basis of my calculations, to forget about welding and rewelding the tubes; but instead to make some changes and install a new $2 million tube module, after which they would have no trouble. (And indeed they have not.) Then I advised them to enter a products liability suit against Babcock & Wilcox, Ltd., in London, who had designed this boiler and done it improperly.

To follow up on that, I had to go back and conduct major studies because there were so many different people involved, and each had a different viewpoint. I did mathematical analyses, ran experiments on the boiler system, and made videotapes. I went to London and met with B&W people, and then I presented my report. The first part of the report contains all my base calculations; the appendices contain what is called the "state of the art." This is what was known and published about boiler tube vibration, and prediction of boiler tube vibration, at the time the boiler was made in 1972. I found that B&W did not use the state of the art—I think, in fact, that they just guessed at what they were doing.

I was able to do all this for the paper mill because I had been studying law. I knew the structure of the law; the logic of law. Now I could produce a report suitable to be handed directly to an attorney. There is now a $4 or $5 million damage suit pending in London. The mill's attorneys drafted a "complaint" (which details the particulars of the suit) and sent it to me for comment. I rewrote it completely, to eliminate technical errors and misunderstandings, and returned it to London. I expect I will have to go to London to testify before this case is finished.

This is a case that involves every discipline of mechanical engineering that you could put together; now I use the problem in my courses here at WPI as a vehicle for teaching.

Q: How do you do that? What do you carry over from that case into the classroom?

In the Interactive Qualifying Projects (IQP) I advise, I have my students read a legal book on products liability, including case studies that I have developed. I want to get them accustomed to the strange and dense language of the legal literature. I give them reports like the one on the boiler tubes to look at, and we discuss these in class. Then I give them a simple case and ask them to determine whether a particular product is reasonably or defectively designed and manufactured. We discuss that case and suddenly begin to see very different opinions in the classroom. I bring in a judge to discuss his role in a products liability case, then a plaintiff's attorney, a defense attorney, and maybe an insurance company representative, each presenting their sides of products liability. Then we'll go to an actual court case—visit a trial in progress, if possible. I'll have them sit in on actual depositions to see what is involved.

Finally, I'll give my students the raw material of a new case, perhaps something I've worked on which has already been to court, and they each have to produce an expert's report.

Products Liability—definitions and a few recommendations

In order to clearly understand some of the things mentioned in this interview please note some of these key concepts which are invoked in products liability litigation:

WHAT IS PRODUCTS LIABILITY?
Products liability is the name for a special branch of law which deals with suits alleging injury to a person (or his own product) as a result of an alleged defect in a product.

NEGLIGENCE.
If the product was poorly designed or manufactured because care wasn't taken, then the manufacturer can be held responsible due to his negligence.

STRICT LIABILITY.
No matter what the reason for the product's failure, no matter how many precautions were taken by the manufacturer, he might be held responsible under the doctrine of strict liability if the defect was in the product when it left the manufacturer.

IMPLIED WARRANTY.
The fact that an item is offered for sale is an implicit statement that it will do its job and that it is reasonably safe. This doctrine of implied warranty helps protect the consumer.

EXPRESS WARRANTY.
Anytime the manufacturer or seller makes a specific statement of a product's properties or capabilities, this can be held to be an express warranty applicable to that product.

Based on his work, Professor Hagglund suggests that any person involved in product development or manufacturing consider these 4 critical questions:

1. How will the product be used?
2. In what unusual but foreseeable ways will the product be used?
3. How could a person be hurt while using the product?
4. How could another company's product—a system—be damaged as a result of a defect in a component product?

In addition, Hagglund lists the following 10 common charges of negligence often encountered in the product development cycle. He notes that if these are considered early on in the design and manufacturing processes, the chances of successful product liability litigation against the manufacturer are significantly reduced.

Creating a design:
1. The designer did not foresee possible alternative use of the product.
2. The design did not incorporate proper safety devices.

Analyzing the design:
3. The product was defectively designed. Examples—improper calculations; no calculations; improper use of codes and standards; current state of the art not used; improper selection of materials.

Preparing the design for manufacturing:
4. The product was not tested prior to being released to manufacturing.

Manufacturing the product:
5. The product was defectively manufactured. Examples—improper welding; improper fasteners; defective materials; improper heat treatment.

Testing the product:
6. The product lacked sufficient quality control testing. Examples—dimensions out of tolerance; a lower-quality substitute component incorporated; no x-ray testing; no testing of the final product as it will actually or foreseeably be used.

Selling the product:
7. The product was improperly advertised. Examples—misleading claims; over-energetic salesperson.
8. Instructions for proper and safe use of the product were not given.
9. The product lacked proper warning signs.

Post sales:
10. The manufacturer did not notify all owners of the products that new safety devices were available or that a design modification hadbeen made to improve the safety of the product.

SUGGESTED FURTHER READING:

General:
Alvin Weinstein, et al., *Products liability and the reasonably safe product* (John Wiley & Sons, 1978).

Legal:
E.N. Swartz, "Hazardous products litigation," Chapter II of *Theories of liability* (Lawyers Cooperative, 1973).
Harry M. Philo, *Lawyer's Desk Reference*, volumes I and II.

Codes and Standards:
Accident prevention manual for industrial operations (National Safety Council, 1974).

American National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018

Q: In your products liability work, do you usually work for the defense?

Of all the cases I look at, I would say they divide up pretty evenly—about one-third of the time I work for the defense, one-third for the plaintiff, and the remaining one-third I don't see a case to be made, so I don't go any further.

Q: How involved do you get with the legal procedures involved in suits, other than just testifying?

Look at a current case I'm working on. A well-drilling rig had been working on top of a mountain in Vermont. The driver started to take the rig down the hill when he heard an air leak in the cab. He felt around, trying to find the source of the leak. What it was, of course, was the air brakes, but the leak wasn't big enough to trigger the automatic emergency brakes. The driver tried to regain control of his truck; he was still traveling only 15 miles an hour. But with a 15-speed transmission, you can't just downshift and upshift whenever you want. The driver couldn't get control. The main ("service") brakes wouldn't slow the truck, and the driver couldn't downshift . . . he had to upshift, in fact, which only made matters worse, because it let the truck go even faster. The trucker had a mile to go down the hill. After he began really moving, he pushed the button to apply the emergency brakes. But this didn't slow him down much. He was driving this 44,000 pound well-drilling rig down the mountain, no brakes, taking turns on two wheels, with the speedometer pegged at 80 miles an hour. He finally made it down the mountain to face a T-intersection. He saw ahead of him a field, so he went straight ahead. But it wasn't a field; what he thought were bushes were the tops of trees. He went down a 70-foot drop, about 300 feet into the woods.

I went up to Vermont and ran physical tests using a comparable rig on those same mountains. It turned out the braking system for that truck was totally inadequate; it had been defectively designed. This was a 1965 truck, and the accident occurred in 1976, only two months after the truck had been refurbished and resold. I declared that it was refurbished improperly, because the brakes had never been touched. On level ground, this truck took 90 feet to stop from 20 miles per hour. (And with the emergency brake it went almost 200 feet.) All laws require that a vehicle stop in no more than 40 feet from that speed using the service brake.

I had to construct the entire legal case: the basic elements of the demand and the interrogatories—questions to the companies being sued for the purpose of getting information which I needed and which should be available. By law, they have to answer these within 30 days. I prepare these, and then the lawyers put in the necessary legal language at the beginning and the end, but they leave the technical material the way I write it.

I word these interrogatories so they are quite specific, so there is a definite answer which must be given. For this case I put together perhaps 100 questions. After reviewing the answers to this first set of interrogatories, I put together a second set, aiming at getting more refined answers. In this case we have not received the signed answers to the second set, because they will not answer one of my questions—and they don't want to do it because their answer will nail together my entire case.

Depositions are another area. After you know a little about a case, you want to find out specifically what the expert at a particular company knows about what that company did. So a deposition is taken from that expert, under oath, and it can be used in the courtroom. I prepare the attorneys carefully for each deposition. I write out the questions for them to ask. We talk about what they want to cover, get the logical framework right, then I sit with them at the deposition to hear the answers. Based on the answers, I write out subquestions, where we need further probing. This way we get the information we need, on target. Most depositions which are taken by an attorney alone, without technical support, are so broad and ramble all over the place, that the information is often of no use. When I see that, I wish they could take another deposition; but under the law they only get one chance at it. Technical backup is extremely important here.

Q: In a case like this, who is actually being sued?

Here we first have a company that sold a drilling rig consisting of a drilling unit mounted on a truck. To produce this they needed a truck, which they ordered from a truck manufacturer according to their own specifications. For example, no front brakes. For example, emergency brakes only on one of the two rear axles. For example, the small size of the brakes to be used. Yet the company which issued these specifications had no expertise whatsoever in brake technology or in the stopping of vehicles.

The truck maker builds the truck. Now we're dealing with ethical questions. Is it proper for the truck maker to build the truck according to the specifications of the purchaser, knowing full well that this vehicle will be driven on the roads of the United States and that it does not meet, and has no chance of meeting, any state requirements for braking performance? The maker of the truck is negligent. He should not have taken that order unless he convinced the customer to do things differently. It just happens that truck maker built trucks of a similar type for other companies during that same year, 1965, and in those other trucks it employed the best brake technology available at that time.

So the truck maker is at fault. The company that ordered the truck and put on the drilling unit is at fault. Now another company comes into the picture, some eleven years later. In 1976 we have an old truck, with an old drilling package. This latest company painted the old truck and put a brand new drilling package on it. This truck is sold, again to be driven on the highways, but it has no chance of being properly registered in any state. The braking system doesn't even begin to comply with the newer, more stringent requirements in effect for truck braking systems.

This company says that they don't build trucks, so it's not really their problem. But I say that they sold the truck, and they should have had the brakes repaired and upgraded, because it was possible to do so. This rig sold for $100,000 in 1976, and it would have cost only an additional $240-$500 to upgrade the braking capacity of that truck so that it would have been able to stop properly.

Q: You've talked about the technical side of your cases. What happens, though, when these cases come to court? How do the attorneys on the other side counter your testimony?

If you know the system, you're really in business. I went to Sandusky, Ohio, to testify about an accident that took place in Worcester. A boy was hurt in a shear-grinding machine which required that the operator place his hand very near the grinding wheel when he turned it on. It took four seconds for the machine to grind off two fingers. To expose a person to this kind of injury is bad design.

I arrived in Sandusky to discover that the trial attorney had just been selected, and he didn't know anything about the case. I met with him on Sunday to prepare him to make his opening statements to the jury on Monday. I had to be sure that he knew what to ask of witnesses, to elicit the right answers which would to set the basis of fact on which I could then speak and render an opinion. If the factual base isn't set right, then no opinions can be given.

I worked with the attorney through Tuesday, when the case hit a severe snag. The law of Massachusetts had to be applied there in Ohio, and they didn't know which law that was. Fortunately I had my law books with me, and I could give them the proper legal citations so they could find the actual law. The case continued without delay.

I was on the stand testifying, when this question was put to me: "Professor Hagglund, wouldn't a reasonably prudent person have pressed the stop button?" 'Reasonably prudent' are the magic keywords here—you just have to know that. I said "No"; and it happened that the judge recessed the trial until the next day. The defense attorney came over to me and said that he was not going to call me in the morning, and that I was free to return to Massachusetts. I could leave that night, in other words. I knew this had to be a set-up, so I quickly went to see my trial attorney. I told him, "I guess I'm going home tonight, Tom, because I've just been given permission to leave." He almost flipped because of the unethical nature of that defense attorney's behavior.

Of course I didn't leave. I stayed to tell the jury my side of the case, and it resulted in an award of $60,000, which was a big award then for two fingers. This case, after review, set a legal precedent in the area of machine design.

Q: The other side doesn't always want you to be there, do they?

No. That was one tactic that has been used to get me out of the courtroom. A different one was used in the Turcotte case in Rhode Island. I was asked to identify the accident car in some photographs handed me by the defense attorney. I had taken my own photographs in the case, some three years earlier, but I hadn't looked at them in a long time. So I told the judge I needed more time to study the pictures before I could give my answer. The defense attorney pressed hard for an immediate answer, but I said I needed to compare these new pictures with the ones I had taken, looking at scratches and so forth. The judge recessed the jury to give me time to study the pictures. They were pictures of a different car, not the one involved in this case at all. Clearly, the defense attorney wanted me to identify the pictures as showing the accident vehicle, and then he could discredit my identification and thus all of my testimony.

Another case happened in Worcester. An attorney whom I'd run into before didn't want me to testify in a punch press case. He brought in his own expert, who worked for the maker of the punch press. This lawyer then asked his witness, "By the way, this machine was made in 1943. When were you born?" And the fellow replied, 1937. "My gracious, then you were how old when

this machine was built? Six years old? You didn't have an engineering degree then, did you? Did you know very much about engineering? Did you do any engineering at that time?" Well of course the answers were all No. He then looked at the judge and said, "Your honor, I move that my witness, my own expert, be discredited, disqualified, for he did not know anything about the practice of engineering at the time this machine was built." The judge said, "Of course."

Then I was called to the stand. "Professor Hagglund, when were you born?" 1934. "How old were you in 1943? Did you have a degree? Did you practice engineering? Were you employed by any engineering companies?" Of course not. "Judge, I move that this witness be disqualified." I was off the stand in a flash.

That brought the case into a state of limbo. There were no witnesses to testify. How could the case go on? It either had to be settled, or there had to be a motion for a new trial. I recommended a settlement in this case. But it certainly was a cute tactic.

Q: It sounds as if you really enjoy the cut and thrust of the courtroom.

I do, and I can accept the pressures. My absolute rule, whether I'm working for the plaintiff or the defense, is that I handle my own case completely, with no restrictions from anybody imposed on me. And when I take a position—which might be 'there is no case here'—that's it. If I decide there is a case, then I insist it has to be fully developed, with no loose ends at all. And good attorneys only want it that way.

The problem is that, when you do a thorough job, it costs money. However, if you don't do a thorough job, you're made to look like a fool, and I don't like that. I won't be made to look a fool. I won't even touch a case unless I have full rein.

I have a lot of respect for attorneys. Some of them are incredibly brilliant, super people. A lot of engineers take the position that they don't like attorneys; therefore they won't work with attorneys. They won't do products liability work.

Well, I've worked with attorneys all over the country, and I would say that, out of several hundred, there are only three I have encountered who are unethical in the way they handle things. I cannot say, on the other hand, that I have seen many ethical experts. Instead, I've seen unethical and unprepared experts, people who are simply not qualified. There are many experts—I could name names—who will give you any opinion you want so long as you pay for it. That's terrible. And they are engineers.

I think what the system needs is more people from the academic world, who don't make their entire living this way, and who therefore can be more objective, more free to take a position or not take a position . . . and they also have more expertise than most of the experts I see. The only trouble is, the academic people don't want to get involved because of the pressures that accompany the legal process. Some people's emotional systems cannot stand that pressure. I happen to have the chemistry, the temperament, to take it and give it back. I enjoy the confrontation. I wish we had more people who did.

About 1975 or 76, I thought seriously about quitting WPI and going to law school. I could sense that I had an affinity for the legal work, and I knew I could put it together with my engineering background. But that would have involved three years of law school, and then I'd have to start to build a law practice from scratch. I decided not to become a lawyer, finally, because I enjoyed and was successful at what I was already doing.

Q: Are there times when your technical findings are ignored or not used by your clients?

There was a fire, outside of Yosemite National Park, where a person was terribly burned, and it was charged that an improperly designed gas hot water heater control was at fault. I flew to St. Paul, Minnesota, to look at the actual control and take photographs. I could see that this control had been totally abused. Abuse is a valid defense. An engineer has no obligation to build a totally accident-proof device, but he does have to build a reasonably safe product.

The plaintiff, I knew, would argue that the product was defective and unsafe. I would argue that it had been abused and was, in fact, safe. I did tests to show that. Then I met over a weekend with the defense attorney from San Francisco. We talked the case through, and knew there was a solid defense case. But he called me back at 1:30 in the morning and said, "Ray, I've thought about it, and we're not going to have you deposed. We don't want to put the plaintiff's attorney through college. They have called in five experts, who are not knowledgeable at all. They have done no testing, they don't have any theory about how the accident happened, they just contend that anything made out of plastic is bad. That's their position. Since they don't have a theory, and since they don't have any physical test evidence, and since their lawyer doesn't even seem to know just where he is going, all we could do with this type of defense would be to educate our opponents.

"And besides, even if this attorney doesn't use the information in this case, we know that he will seek out other gas hot water heater cases just so that he can make use of it."

Therefore I was not deposed. On that Monday morning, the plaintiff's attorney of the questionable ethics telephoned me and wanted me to five him a summary of what I would have said if we'd gone through with the deposition. That is totally unethical behavior. I've run into this man two times, and he has acted unethically twice.

In this case, the court strategy is rather strange to me: we have a solid case, but we don't want to use it because it would give the plaintiff attorney ideas for his next case, and my testimony would become public information. However, the defending company attorneys know how to cross-examine the other side, based on what I have explained to them in private, and so here I am retained strictly as a consultant. Conceivably, at trial time I could fly to California to consult with them and help direct the attorney in his cross-examination of the witnesses. We'll have to see.

Q: In the cases you've been discussing so far, they appear—the way you present them—to be fairly clear-cut examples of liability or not, even though some involve fairly sophisticated technical knowledge. Do you find most cases are this way?

When I look at a case, if I find there is a legitimate defense, I will work for them. If I find there is not a good case, I will advise them to get out and settle. I just call it as I see it.

Once I decide there is a case, I do my utmost to pull together the complete logic that will be used in the courtroom, to show the clarity of the case. Remember, there is somebody on the other side who is (hopefully) doing the same kind of thing. Because of these two viewpoints, the case may become quite unclear now to the jury. It isn't black and white. In fact, if a case is totally black and white after everyone has done their homework, the case will settle outside of the court. Through depositions, the defense and the plaintiff each have a pretty good idea of what the other side is going to say. If they can all see that it will work to the advantage of the plaintiff, there will be a settlement. If it will work for the defense side, the trial may go on, or there may still be a settlement (a lower one). But if both sides are well balanced, and they each believe in their cases, it will go to trial and the jury will make the final determination.

That's another ball game, of course, because of the jury. They have no special skills in calculation, no special knowledge of technology or whatever else may end up being introduced into that courtroom. They generally don't take notes, and a long products liability trial can last three to six weeks. They can't even talk to one another during the trial until the very end, when they deliberate. An awful lot of testimony must get lost in the process, because they can't possibly remember all the important statements. I've been on the stand for as long as four days in a row. That's a lot of testimony. How can jurors possibly retain all that's important? They can't, of course, and so it becomes more an issue of the witness's credibility.

For example, take an accident case that occurred in New Hampshire, where a motorcycle hit a Cadillac. After examining the police report, I was able to calculate that the motorcycle hit the Cadillac at 84 miles per hour, and that it was accelerating at the time. I did this on the basis of the trajectory of the sunglasses the motorcyclist had been wearing.

This was a $1 million lawsuit. When we went to trial, I gave the jury a course in calculus and a course in dynamics. I derived every single equation that I used. I explained fully to the jury that I didn't expect them to follow what I was doing to the point where they would become engineers, but I wanted them to see that there was logic behind all the final equations, and the other expert was free to shoot them down if he could. Either they had to show Isaac Newton was wrong, or I made an error.

We won that case. It took a major amount of effort, and the jury surely didn't understand all they heard, but they had somehow to believe in what I was doing. So they were in college for four days.

Q: It sounds like the fact that you're a professor and used to teaching is a distinct advantage at times.

I think that's true when you're trying to explain something to a jury. Trials can be very complicated. Products liability is one type of thing, and accident reconstruction is another, but they kind of blend together in motor vehicle cases, where you need to use dynamical calculations and mathematics to determine the speeds of vehicles. The real question often is, was it the speed of the vehicle or the defect in the automobile that really led to the injury? In most of these accident reconstruction cases, or cases involving calculations, some lawyers really get lost—particularly the ones who majored in English or history. In those cases, I write out all the questions the attorney is to ask, then I give them the answers they should expect, and if they don't get the right answer, then they have to probe around until they do come up with the answer we need. That kind of direction helps even a non-skilled witness come across in a convincing way, because the questions have an order to them that makes things work out.

I don't want you to get the impression I'm always on the winning side. I lose cases too, and that takes getting used to. Juries can be quite peculiar. As firmly as I may believe the facts point inescapably to one conclusion, sometimes I know the jury finds the other way out of sympathy for the person involved. That's hard on me as an engineer and as a person, because it seems to violate everything I stand for. When I lose a case like that, I get kind of depressed and discouraged, but I have to be able to get back to work and pull myself out of it, and in a couple of weeks the depression will pass.

Q: You seem to do just about everything, don't you? does that make you the "technological humanist" we talk about at WPI—the person who can temper his technical skills with judgment, and relate his professional work in a meaningful way to social concerns and human values?

Maybe. I do know that I have a lot of respect for the Interactive Qualifying Project (IQP) which we require of all WPI undergraduates. In the IQP we have our students do a project where they have to relate their technical skills to the real needs of society. Sometimes I'm not sure just how many students or even professors really understand what the IQP is all about. But I consider myself to be an acting professional in the field of IQPs (in the area of products liability). It's an exact match of technology to law to IQP to what we do here at WPI. I think my work provides an example, a role model, of what one person at WPI can do, what the IQP is in the technology-law area, what one engineering professional does in this field as a consultant.

My IQP students do their projects in the field of products liability, and they learn all that that entails. Humanities Professor Tom Shannon teaches a course on ethics, and I visit that class and talk about what I do: the tough professional decisions, the ethical decisions you have to make when you can't use equations—the judgment calls.

A few years ago, I presented a talk at the University of Massachusetts on ways of introducing products liability into engineering education. It frightened the professors I addressed even to consider this a part of their responsibility. They'd never thought about it. It wasn't their job.

As far as I'm concerned, it's an important part of my job.

Basically Bernie

by Ruth Trask

QUOTE FROM A PARENT of an incoming freshman after attending the newly instituted WPI parent-student summer orientation program held on campus in June: "I posed a question to the program director [Dean Brown], which he had to research and answer. He sought me out among the crowd and answered my question. I thought to myself, 'Now *that's* incredible.' "

Add approachable, imaginative, and innovative to that parent's 'incredible,' and you'll get the basic Bernard H. Brown, Dean of Students at WPI. During Bernie's 15-year career at WPI, he's had plenty of opportunity to display his many talents, but perhaps, never to such advantage to WPI as this summer during his shepherding of the all-new orientation program.

"The program was purely voluntary," Bernie explains. "We selected a cross-section of 150 incoming freshmen and their parents to spend a weekend on campus. Among the people who spoke to the parents and students during the weekend were staff members from Student Affairs, various department heads, professors, and project advisors. Of special importance were the student orientation leaders, who were available to give first-hand information from the student perspective about WPI's academic program, the faculty, staff, and student life in general."

On two consecutive weekends, different sets of parents and students were housed in separate residence halls and served traditional meals. They attended orientation sessions and engaged in lively post-lecture discussions. One of the most popular features was a non-scripted video-taped session dealing with typical campus situations, such as roommate adjustment, peer pressures, academic concerns, and parents' anxieties. (A number of parents had not attended college, and they found the tapes as informative as did their sons and daughters.) The tapes were created by the Instructional Media Center on campus with WPI students from theater-related courses role-playing the various situations.

The orientation effort was the initial step in a totally new parents' program which will include a complete Parents' Day in November, communications throughout the year to parents, and a Parents' Handbook to assist in their understanding of WPI and the environment their son or daughter is about to experience.

The summer program will be evaluated by the Office of Student Affairs, and a recommendation given to the President's Advisory Council some time this fall. Says Bernie, "The problem with creating a successful program like this is that it puts greater demands on an already overworked staff to do an even better job the next time."

Overall comment following the fledgling program was highly favorable. Over 60 percent of the parents and incoming students returned evaluation questionnaires. One parent wrote: "Everyone involved was most helpful . . . . We felt privileged to be a part of it . . . . It was the most rewarding and profitable one-and-a-half days that we've spent in a long time." Another said: "The manner in which the faculty and students conducted themselves is excellent advertising for WPI and gives parents a nice feeling about the school."

The incoming freshmen were also impressed. Said one, "There was an unusual atmosphere of friendliness in everyone I met." Another agreed: "One of the best parts of the program was meeting new people, both staff and students." Yet another summed up what most of the prospective students indicated: "I feel the summer orientation program is an excellent idea and should continue to be offered . . . . I learned a great deal about the academics, programs, activities, and student life. If I had not participated, I think I would be like a chicken running around without its head in the fall."

According to the evaluation sheets, the number of headless chickens at WPI should be far fewer this fall, thanks to Bernie Brown's progressive-looking orientation program.

AN EARLIER BROWN VENTURE is Cinematech, a program in which many of the best contemporary international films available are shown free to the campus and Worcester community. "Actually, one of our early social chairmen approached me with the idea about eleven years ago," he says. "He was interested in showing some international films, and had discovered a 'gem' by the name of Minnie Levenson, who had previously been affiliated with films at the Worcester Art Museum. Minnie has been with us ever since. The first couple of years we had to drag students in as they passed by Alden Memorial Auditorium. This past season was Cinematech's finest hour, as we had two showings of all the films and

turned people away practically every showing. The program has such a good reputation now, thanks to Minnie Levenson's expertise and hard work, that the Canadian consulate has offered us a film for this year's series at no charge. They want very much to be a part of such a prestigious program."

Besides using his innovative touch with the orientation program and Cinematech, Bernie has helped inject new ideas into the 1981-82 Student Handbook. "Last year we scrapped the freshman directory, at least the kind we used to have," he says. "We opted for an all-student type of publication which would serve the entire campus. And this year we've added a touch of humor."

A perusal of the new handbook, which Bernie has worked on with Charlotte Wharton, graphic designer from Publications, proves his point. Interspersed with nuts and bolts information about everything on campus from academics to activities, are off-beat illustrations and old-time movie photos with new, WPI-related captions. For example, under a photo of Laurel and Hardy costumed as elves in Santa's workshop runs the caption: "The Project Center is open every weekday evening for students to research their IQP's."

Along with his recent promotion, Bernie, who came to WPI via Springfield College and the University of Connecticut, continues with his long-term responsibilities for international students and student government. "I have always advised the international students," he reports. During the Iranian crisis, he helped Iranian students who had difficulty getting money out of their country, and who had lost contact with their families. "We had an obligation to them. We still do."

Currently, Bernie is involved in establishing an international house for students on campus. "We should be able to use a school-owned house adjacent to the campus by November," he says. "It is one of the most exciting opportunities we have had and should allow for an easier assimulation to our culture and our way of life for the international population."

At present, there are about 230 international graduate and undergraduate students at WPI. They come from different backgrounds, and have different needs and concerns: English as a second language; orientation to our academic process; culture shock; housing and medical information. Bernie helps the students prepare for any eventuality.

He still heads the club sport program, which now includes 22 various clubs, many with coaches of their own. The crew team participated at the Henley Royal Regatta in England this summer. A few years ago, the WPI club bowling team won the national collegiate championship, and the lacrosse team has recently had a number of successful seasons. The club sport program has come a long way. At present, over 400 participants are enjoying a competitive, healthy, athletic experience, which could lead to a lifetime of recreational sports participation.

Bernie's recent promotion to dean means that he can concentrate on planning and on the more creative areas, while still retaining some association with his former activities. He continues to advise the student government and the officers of all four classes, and he oversees all the activities of the Senior Class.

There have been other recent changes in the Office of Student Affairs (OSA). Currently, Bernie reports to Robert Reeves, Vice President for Student Affairs, who joined WPI two years ago. Janet Begin is Assistant Dean of Students, and Glenn DeLuca, Assistant Director of Student Activities. Both report to Bernie. Additionally, Patty Lewis, Coordinator of Residence Operations, also reports to the OSA.

As Dean of Students, Bernie deals with some student counseling and a variety of other situations in his campus office, but he doesn't have to be there to know what is going on. Since last year the office has installed a 'beeper' system to be able to keep in constant touch with everyone, to take care of breaking developments and emergencies, no matter where they might be. "Just ask my wife, Gayle, about the new system," he says. "I forgot to tell her I had the beeper at home one weekend, and when it went off, she thought it was the smoke alarm and started to rush the kids out of the house. It's that loud!"

He chuckles. "Looks like the beeper is one Student Affairs innovation that still needs some refining."

1917

Russell Callahan writes that he still sings tenor in the church choir. He also serves as music committee chairman and deacon for the church.

1930

Carl Backstrom, long-time chairman of the Citations Committee has stepped down from being top man to a committee member. "Time for a younger man," he says. Prof. **Ken Scott, '48** will be the new chairman. As the father steps down, the son steps up. Carl's son, **Gregory, '70** is now the president of the Worcester County Chapter of the WPI Alumni Association.

Mr. and Mrs. **Harold Williamson** celebrated their fiftieth wedding anniversary on June 28th at a reception planned by their daughter and son-in-law at the Florida Institute of Technology in Melbourne.

1931

Warren Doubleday and **Roger Lonergan**, were not only classmates at WPI, they both became closely associated with the Quabbin Reservoir project in Massachusetts during the Depression. Doubleday, who lost his family home when the town of Dana was flooded to make way for the reservoir, worked as a civil engineer on the project starting in 1933. He was sad about the loss of his home, but in the depth of the Depression, he really needed the job. "I always looked at it from an engineering standpoint. There was no question it was a good place to put a reservoir." For the last two years, Lonergan has served as the MDC supervisor of the reservoir. His involvement in the project began in 1928 with a summer job, and he has worked as an engineer for the MDC ever since. He is also a town clerk for four towns.

Phil Pierce, who came the greatest distance (drove!) to attend his 50th reunion this summer writes: "Two others came from California, **Red Sage** and **Cliff Bergquist**, but I was introduced to spherical trigonometry by 'Happy' Gay, and I believe that 'great circle' distances would prove me correct even though I do live on the east side of our street here."

He says that he and his wife Irma, "enjoyed the 50th golden reunion beyond words—one of life's memorable highlights."

1932

Constantine Orfanos' youngest daughter recently graduated from the University of California at Irvine. She received a BA in fine arts.

Leon Skuropat is still located in Sao Paulo, Brazil.

1933

In May, **Alexander Alves** was awarded an honorary doctor of engineering degree during commencement ceremonies at Tri-State University in Angola, Indiana. Born in Brazil, he earned his bachelor's degree in mechanical engineering from Tri-State in 1931, and received his second BSME from WPI in 1933. Alves, who is chairman of the board of Engineered Sinterings and Plastics, Inc., has published a number of technical papers on sintered metals, including magnetic properties of sintered powder and on plastics. He served as secretary and chairman of the American Society of Mechanical Engineers, Waterbury, Conn. section, and has been listed in *Who's Who in New England* and *Who's Who in Engineering*. In 1974, he received the Distinguished Service Award from the Tri-State National Alumni Association.

Bill Slagle writes that he is in over his head in church work. He serves as church clerk and had to prepare reports and statistics for the annual April meeting. Also, he has served as chairman of a committee rewriting the church by-laws and as chairman of the music committee. He is located in Medford, Mass.

1937

In June, **Gordon Crowther** retired after completing nearly 44 years of service with Industrial Risk Insurers, formerly the Factory Insurance Association, a leading international underwriter of commercial property insurance. He joined IRI following his graduation from WPI, and has held a variety of engineering supervisory positions throughout his long career, culminating with his post as engineering personnel administrator in the home office. Recently inducted into the Society of Fire Protection Engineers, Gordon has long been associated with the Honorable Order of the Blue Goose International (an insurance group), which he served as a past Most Loyal Grand Gander (i.e., president). He has been active with the WPI Alumni Association in many capacities, including that of executive committee member, fund-raising committee member, and president of the local alumni chapter. In 1977, he received the Herbert F. Taylor Award "in recognition of distinguished service to WPI." In retirement, Gordon and his wife Ivye will continue to live in Hartford, Conn. Although they have already visited 49 states and much of Canada, Greece, Bermuda, and England, they hope to do more traveling, principally on the North American continent. Gordon plans to remain active with the Masons, ATO, and with WPI alumni activities.

Dana Woodward continues as president of American Shoe Machinery Co. His firm developed the American Tru-Fit Shank System, a machine which automatically cuts the material to the correct length, positions it on the insole to an exact fit, then bonds it and cures it with heat, making it a rigid shank. The system quickly became recognized and accepted by most major shoe manufacturers, one reason being that it cut the cost of the shanking operation. Currently, the company is the U.S. agent for shoe-making equipment produced in Germany, Denmark, Italy, and Mexico.

1938

John Despo is now retired and lives in Westlake, Ohio.

1939

George Yule recently sold the long-time family business, Leominster (Mass.) Granite and Marble Works. Over the years, the firm designed and built a number of monuments in Leominster, including the World War I veterans' monument, the Spanish War veterans' monument, the Johnny Appleseed monument, and the Indian mortar monument. A bell commemorating the Korean War was designed by George.

1940

Herbert Morse writes: "In February GE asked me to consider working at a new satellite plant in Wilmington, N.C. This plant is starting to make components for jet engines that were previously machined in Cincinnati. I had worked with these parts in a similar capacity for over 25 years, and the experience in systems, methods, problem areas and unique operations was needed in this new facility." Currently, he holds the post of senior engineer for quality control in Wilmington. "This is an interesting phase of the business with many challenges and opportunities to apply past experience to a growing area. The move to a totally different climate, farther south and near the ocean, is a noticeable change and is very rewarding." Morse expects to be in North Carolina for two years, and then retire to Cincinnati.

1941

Robert Brautigam continues as technical manager for Durez Plastics Division of CanadianOxy Chemicals, Ltd. in Ft. Erie, Ontario, Canada. The firm is concerned with phenolic molding compounds and resins. Bob, who says he enjoys excellent health, plays golf and tennis, and hopes to take up skiing again. In the summer, he and his family vacation in their rustic cabin at Georgian Bay on Lake Huron. Last year, he had an exciting reunion with his brothers, Mike, '43, and Lawrence, '49, and their families in Frankfurt, Germany.

Stanley Ribb has been named senior vice president at Blackstone Valley Electric Co., where he recently stepped down as president. It is expected that he will retire later this year. Blackstone is a subsidiary of Eastern Utilities Associates. Ribb was president of the utility for the past ten years. A resident of Cumberland, R.I., he is married and the father of two sons.

For career-long excellence in teaching design, Dr. **Charles Smith**, former professor of engineering at the University of Nebraska, has been awarded the first Fred Merryfield Design Award from ASEE. The award is sponsored by CH2M Hill. Smith, whose career in education spans 40 years, is credited with a pioneering program at the University of Detroit that "raised engineering design education to the master's and doctoral levels." A former student said Smith's design courses differed from the traditional ones by his use of unstructured real-world issues. In addition, the majority of his courses enlisted outside clients, who brought not only their problems to the classroom but also their active participation in the design process. The City of Detroit was a client. Smith wrote nearly 90 research papers and 15 ASEE engineering case studies, ranging from "To Pinch or Not to Pinch" to "Problem of the Perverse Pinion." His recently-received award consists of $1,000, a plaque, and a $500 stipend for travel to the Annual Conference. In addition, his former department at Nebraska will receive $500. This fall, he will take up a new post on the faculty of Rose-Hulman Institute of Technology in Terre Haute, Indiana.

1942

Bob Allen is with the Pump Group at Ingersoll-Rand in Phillipsburg, N.J.

1943

Robert Schedin continues as president and chief executive officer at Fairlawn Hospital, Worcester. Fairlawn is one of three hospitals in Worcester which pioneered same-day surgery. Although the smallest hospital in the city, it has by far the busiest same-day program in the area. Schedin, who promoted the innovative program, has an unlikely background for hospital administration. Prior to joining Fairlawn in 1972, he had designed looms at Crompton & Knowles Corp. for 28 years, rising to director of engineering.

1944

In June, **Earl Harris** was honored by the board of directors of Rodney Hunt Co. following his 25 years of service as president of the firm. The board presented him with a resolution acknowledging his contribution as chief executive officer to the success and growth of the company, his service to the community, and his contribution to the cause of professional management. He joined Rodney Hunt in 1946 and became president in 1956. He attended Dartmouth, MIT, WPI, Babson Institute, Lowell Tech, and the University of West Virginia. During World War II, he served in the U.S. Army with overseas service in the China-Burma-India theater. Currently, he is a director of the Blue Shield of Massachusetts and a member of the Business Advisory Council of the University of Massachusetts. Also, he is a trustee of the Orange Savings Bank. Formerly, he served as director of the American Management Association, director of the Presidents' Association of AMA, and treasurer of the New England Chapter of the Young Presidents' Association.

It's in the bag for him

WPI Trustee Ray Forkey, '40, walked off with some handsome luggage at the Belleview Biltmore Hotel in Clearwater, Florida last April. But instead of being arrested, he was applauded!

The story? Ray and his partner, Floridian Dr. George Dickinson, won second prize at the Southern Seniors Golf Association 54 Holes Team Stroke Championship held on the Biltmore golf courses. Their team of two, best ball, gross score was: 70-72-69, for a total of 211. "We finished just one stroke higher than the winners."

Ray, who is chairman of the current WPI Capital Program, has played in this particular tournament before, but this was the first time he took home a prize. This year, the second prize winners were awarded large flight bags.

Previously, Ray has won the Worcester Country Club Golf Club Championship twelve times. Recently, he qualified for the Massachusetts State Amateur Championship, which is slated for mid-July at the Taconic Golf Club in Williamstown, Mass.

The Southern Seniors Golf Association accepts members who are 55 and over. It has a membership of 1,800. The Association sponsors a number of tournaments annually throughout the South. Tournaments are scheduled this year in Southern Pines, North Carolina, Pine Mountain, Georgia, and Orlando, Florida.

1946

Willard Adams continues as general manager of operations, eastern region, of the American Telephone & Telegraph Co., Long Lines, Oakton, Virginia.

Last year, **John Lott Brown** was elected to the board of directors of the Public Broadcasting Service. He is president of the University of South Florida.

George Button II writes that he has switched from wholesale office machines to building and investing in Florida real estate. Located in Boca Raton, he still collects and restores antique automobiles.

John Carpenter, Jr. is a manufacturers' representative in Walloon Lake, Mich. Presently, he represents Wick Homes of Mazomanie, Wis. in North Dakota, South Dakota, Montana, Wyoming, Idaho, Utah, and Colorado. He enjoys world travel, especially in the Orient. Last year he went to China for the third time.

Ken Chafin serves as major project director in the corporate engineering department at Monsanto Company in St. Louis. Recently, he spent 18 months in Florida and six months in Australia.

Henry Chin is vice president at Drexel, Burnham, Lambert in Los Angeles, a member of the New York Stock Exchange. He belongs to the Shrine and is a post commander for the American Legion. Last year, he toured in Scandinavia.

Robert Davis has spent all of his career as a member of a family commercial printing company, Davis-Delaney-Arrow, in New York City. He has been president since 1968. He writes: "Had a marvelous trip on **Auggie Kellerman**'s sailing yacht. He's a great captain, but I kept my eye on the shoreline!"

Currently, **Wilton Ericson** serves as principal process engineer at Blaw-Knox Co., Chemical Plants Division, where he started as a process engineer in 1946. The firm is now part of Dravo Engineers and Constructors.

James Evans, Jr., who has been with Bell Telephone Labs since 1949, has been supervisor since 1958. He enjoys amateur radio. He and his wife have four boys and four girls and live in Andover, Mass. "The two years my family and I spent in Iran for GTE building the national microwave system were perhaps the most exciting we have had," writes **Robert Farwell** of Stamford, Conn. At the present time, he is vice president of market development in the Communications Products Group at GTE. He has served on the school committee and participated in many civic and church activities, especially in Lexington, Mass., where the family lived for 28 years.

Leslie Flood holds the post of vice president of Hutton Publishing, which is a small company specializing in annual catalog/directories. He is located in North Kingstown, R.I.

Howard France is president of Wood Industrial Products Company, Conshohocken, Pa., manufacturers of pressure vessels, a post he has held since 1971. Active in community affairs, he is director and past president of the local Chamber of Commerce; past vice chairman and director of the Conshohocken Bicentennial Commission; and past president of the Northampton Township Civic Association. He was appointed to a subcommittee of a committee of the ASME.

Last year, **Donald Gilmore** retired from Rodney Hunt Co., Orange, Mass., after nearly 30 years of service. He is a registered professional engineer in Massachusetts and past master of a Masonic Lodge. "At 50 I became a motorcycle enthusiast." In four years he and Althea toured through 40 states and five Canadian provinces on his R/90 BMW, ultimately chalking up some 50 thousand miles.

Paul Gorman is director and group vice president of engineering and design at Chas. T. Main, Inc., Boston. Besides being a corporator of Wentworth Institute of Technology and of Peoples Savings Bank of Brockton, he is a member of the Executive Club of the Greater Boston Chamber of Commerce.

William Grogan, dean of undergraduate studies at WPI, was recently appointed a member of the Board of Investment at Bay State Savings Bank, Worcester. He has been a trustee since 1973.

Since February of 1979, the Rev. **Prescott Grout** has entered "active retirement" from pastoral ministry. He is a design drafter at Riley Stoker in Worcester. The Grouts live on a 9-acre farm in Dudley, where they raise beef cattle and chickens, keep horses, and tend a garden.

Since 1948, **Walter Hatch** has been with Exxon Research and Engineering Co. Following overseas duty in the 1960's and early '70's, he is currently licensing coordinator in the petroleum department of ER&E in the main engineering offices in Florham Park, N.J. He enjoys skiing.

Robert Hayward says that he has served 20 years as a Presbyterian clergyman and 10 years as an investment advisor and director of several companies. Civic minded, he has been a board member for numerous community and educational institutions.

Gary Hovhanesian, over the years, has served GE in many capacities, including that of design engineer, laboratory supervisor, development engineer, and product planner. At one time he was president and managing director of a housewares manufacturing plant in Singapore. "Planned, built, staffed, and operated from ground up." Back in Bridgeport, he has been involved with overseas support operations, and worked as product quality manager, and quality systems manager. He is a registered professional engineer in Massachusetts, a Mason, and a Sunday School principal.

Family history and genealogy are the major hobbies of **Robert Hull**. He owns an Apple II computer for word processing, and he is now in the process of writing three books and publishing a Hull family newsletter. At Pratt & Whitney and Lockheed he has made a career out of the propulsion engineering end of aircraft and missiles. "I designed, analyzed, and programmed for the propulsion units for two out of three legs of the Triad." Now he is engaged in the preliminary design for Trident II solid rocket motors. He has invented several fuel control systems, some of which are still in use on most commercial planes flying today. Hull's wife, Barbara, is a member of the Sweet Adelines, an international championship barbershop chorus (Mission Valley Chapter), San Jose, Calif.

Foster Jacobs is director of planning and plant at Southeastern Massachusetts University in North Dartmouth. He says that he's still pursuing a life-long interest in philology.

A professional engineer in California, **Allan Johnson** belongs to the Society of Fire Protection Engineers. During his career, he has served as senior vice president and director of Kemper International Insurance Co. and of the American Prot. Insurance Co. Currently, he is located in Libertyville, Ill.

Joe Johnson is in his 35th year with Pratt & Whitney Aircraft/United Technologies, where he holds the post of group supervisor of support equipment engineering. He is involved with solar house designs for a Cape Cod retirement home.

For 18 years, **Wilbur Jones** has been associated with what is now the Federal Energy Regulatory Commission in Washington, D.C. His present post is that of public utilities specialist. He collects sports publications for a hobby.

August Kellermann is vice president of international operations at Conoco Chemicals Company in Stamford, Conn. For pastimes he enjoys golf, sailing, swimming, and tennis, as well as dining. "Am master of my own boat."

Since 1967, **John Knibb, Jr.** has been pastor of Hampton (Va.) Christian Church. He still loves to fly in all kinds of aircraft, including Navy torpedo bombers, DC-9's, Cessna 150's, Piper Cherokees, gliders, Boeing 747's, and the Concorde SST. In 1978, he flew north of the Arctic Circle over Baffin Island. He is listed in a number of editions of *Who's Who*.

As a result of the missile and space cutback, **Frederick Kull** changed jobs and is now administrator of the grade crossing signalization program for the Southern Railway Co. He is a liaison between the railroad and states on the programs in the 13 Southeastern states. Among his hobbies are gardening and travel.

This is **M. Daniel Lacedonia**'s 25th year at Hamilton Standard Division/United Technologies, Windsor Locks, Conn. For the last decade, he has been chief of materials control and test. Active in civic affairs, he has been involved with the ambulance service, various town committees, and the Lions Club. He writes: "Frustrated Red Sox fan!"

For 33 years, **Arthur Lagadinos** has been with ISO (Insurance Services Office), Boston, where he is staff supervisor of pricing services. He is on the national board of trustees of the Order of AHEPA, the board of directors of St. Spyridon's Greek Orthodox Church, and he does part-time teaching of fire science courses at Quinsigamond Community College. His wife, Helen, is secretary for the biomedical engineering department at WPI.

Richard Lawton is president and treasurer of Buell Automatics, Inc., an automatic screw machine products company specializing in high-volume work 1/8"-3/4" diameter. Buell currently employs 53 people, with sales approaching $3 million spread throughout the country to automotive, business machine, appliance, ordnance, and ball bearing firms. Lawton serves as director of the Rochester Automatic Training Center.

Bo Lutts is owner-publisher-editor of "The Cabot Market Letter", a financial newsletter relating to the stock market. Lutts, who is located in Salem, Mass., writes that he is still playing the clarinet, usually in a couple of local traditional jazz bands. He and Nancy have five children.

With the Foxboro Company since 1967, **Kenneth Lyons** is now a systems specialist in the human resource function of EDP. He was involved in the organization of Sigma Phi Epsilon chapters at MIT and BU. Active with the Masons, BSA, and teaching data processing at Chamberlayne Junior College, he also serves as director of the Braintree Historical Society. He served on former Gov. Volpe's (Mass.) Management Engineering Task Force. He is a 10th generation descendant of John Alden, and has become a member of the Mass. Society of Mayflower Descendants and the Alden Kindred of America.

Jim Maloney holds the post of area manager of the marketing department at Geo. J. Meyer Manufacturing in New Jersey. He keeps several of his own horses at his horse farm in Moorestown.

After 25 years with Hughes Aircraft, **Frederick Marvin** has retired, and has started full time with Hughes Helicopters, a completely separate company from the aircraft company. He is doing liaison engineering on the missile firing system of the YAH-64 2-place attack helicopter, which is due to go into production for the U.S. Army by 1982. He keeps busy with church work, too, rides his bike to work, and jogs several times a week. He has served recently as a WPI class agent.

Pont for 35 years, is now a vice president responsible for the company's worldwide operations in photographic materials, products for the electronics industry, and instruments, mostly for the health care and research fields. He is on the national board of directors of Junior Achievement.

Stanley Morris continues as director of engineering at Columbus Coated Fabrics, a division of Borden Chemical, in Columbus, Ohio. He and Gail have six children and three grandchildren.

Walt Muller has completed 32 years with the Chevrolet Division of General Motors Corporation. During those years he has lived in many areas of the country, including Toledo, Ohio; Massena, N.Y.; and, Detroit, Mich. Currently, he is at the Chevrolet Central Office, where in 1977 he was promoted to regional plant manager. He is responsible for the operation of five plants located in Michigan, Ohio, and Indiana. The plants assemble trucks, manufacture axles, and produce manual and automatic transmissions. Muller and his wife enjoy traveling, especially overseas.

Donald Nichols has retired as associate technical director, Naval Underwater Systems Center, and has moved to Oxford, Me. He is a free-lance consultant in management and engineering, and part-time lecturer at Mohegan Community College, Norwich, Conn. Old house restoration, woodworking, gardening, and running are among his pastimes.

Edmund Oshetsky was recently promoted to senior vice president of operations at Erving Paper Mills, Erving, Mass. He will continue to serve as a member of the executive committee. He joined the firm in 1977 as general manager of the Manufacturing Division. Previously, he had held a variety of posts with Lincoln Pulp & Paper, Boise Cascade, and Scott Paper. In 1978, he was promoted to the new post of vice president of operations and was appointed to the Erving executive committee. The Oshetskys and daughter, Ellen, reside in Greenfield. Erving is a leading manufacturer and converter of paper products, including napkins, towels, printed specialties, health care products, and packaged industrial papers. It maintains operating facilities in eight states.

Norman Padden serves as eastern regional marketing manager for Singer-Kearfott, Little Falls, N.J. He is involved with aircraft navigation systems, communications, and computers.

Julius Palley continues with the family business, Commonwealth Stationers, in Worcester (Fuller Office Furniture in Connecticut). Also, Commonwealth Management acquires old industrial buildings for redevelopment. "Trade association and WPI functions are about my only extras. We have acquired several acres of marsh and riverside areas in Centerville on Cape Cod. Cultivating and restoring this beautiful area has brought us back to days of the good healthy outdoor life and it's a great homing area for our family."

Thomas Passanisi holds the position of principal engineer for Raytheon in Wayland, Mass. For the past 16 years, he has been involved with facilities: reviewing construction plans and specs and monitoring construction. Cabinet-making is one of his hobbies.

Carl Pritchett, Jr. continues as president of his Ford dealership in Albany, Ga. He likes tennis and model ship construction.

Dick Propst is vice president of marketing for Maydwell & Hartzell in Brisbane, Calif. The firm sells electric power equipment to utilities. The Propsts like to travel, but also find their home area 25 miles south of San Francisco "fantastic."

Melvin Rabinovitz holds the position of president of Chelsea Bottle Co., Inc., Waban, Mass. The company distributes plastic and glass containers.

Allan Raymond is now employed as an environmental engineer by the South Carolina Department of Health and Environmental Control. He is singles champ of "B" Club tennis at Coldstream Country Club.

Daniel Rice serves as marketing manager for Advanced Electronic Warfare Programs at Westinghouse. He is located in Columbia, Md., and says he belongs to the Association of Old Crows.

Charlie Richardson was slated to present a talk at the national conference of the Reading Reform Foundation in Houston in August. In January, he had an article published in the "Journal of Learning Disabilities." In 1970, he started his own business as a franchisee of Learning Foundations International. Charlie, who is located in Huntington Station, N.Y., has a patent on a self-bagging attachment for lawnmowers, which accumulates leaves and cuttings directly in a disposable plastic trash bag. ("Still looking for means of manufacturing and marketing.")

Ten years ago, **Donald Soorian** left industry. Currently, he teaches full time at Wentworth Institute of Technology, where he is a full professor. His courses include Control Systems, Transistor Circuits, Applied Field Theory, Linear Circuits, and Active Filter Design. For the past 18 years he has been building a cottage (weekends) in the Buzzard's Bay area.

James Sullivan is vice president of Inryco, Inc., Milwaukee, Wisc., a wholly-owned subsidiary of Inland Steel Company. He is a member of the board of directors at Inryco. Also, he is chairman of the Metal Building Manufacturers Association, which he also serves on the executive committee.

E. G. Tamulevich is retired and living in Paxton, Mass. **Irving Versoy** is the owner-president of Faire Harbour, Ltd., a company which he founded. He is located in Scituate, Mass. Among his hobbies are orchid growing, antique restoration, and clock building.

Del Walton, of D. E. Walton Co., is a self-employed manufacturer's representative. This year he visited Africa, again, the perfect locale for one who enjoys photographing wild animals and insects, and studying their characteristics. **M. J. Waclawek** serves as director of engineering at B&M Automotive Products in Chatsworth, Calif. He and Marcella reside in Thousand Oaks.

Jack Wexler is manager of public affairs at ESSO Eastern Inc., Houston, Texas. **Frank Wotton** continues with White-Westinghouse Corp. He belongs to the Wilbraham (Mass.) Tennis Club and the Holyoke Canoe Club. **Thomas Zajac**, chief of materials and structural integrity at Hamilton Standard/UTC, believes that he must have the longest title in the division. The company is involved with propellers and various aircraft components and systems, in space from the lunar program to the current shuttle. This year he expects to see their first 250-ft. diameter all glass filament-wound wind turbine blades generating electricity in Sweden.

1947

Russell Smith attended the annual meeting of the International Electrotechnical Commission in Montreux, Switzerland in June. Russ is the U.S. delegate to the committee on electric traction. He currently is manager of advanced locomotive systems engineering for GE in Erie, Pa. Skiing and sailing are his two avocations. He lives with his wife, Allene, in North East Pa. His daughters, Penny and Tracy, are both married.

1948

Paul Evans was recently elected as new director and chairman for Region 1 of the American Society of Heating, Refrigeration and Air Conditioning Engineers for a one-year term. (Region I includes New England, New York State, and Northern New Jersey.) A member of the Society since 1970, Evans has served in various offices for the Western Massachusetts Chapter, including president. Nationally, he was chairman for the Research Promotion Committee and a member of the Long Range Planning Committee. A registered professional engineer in Massachusetts, he serves as vice president for Hammill-McCormick Associates, Inc., in Springfield, Mass.

Edward Wainshilbaum is manager of the equipment design department in the RF Systems Lab. at Hughes Aircraft Co., Los Angeles.

1949

Dean Amidon has resigned as commissioner of the Department of Public Works in Massachusetts. He plans to return to his former position as district highway engineer in western Massachusetts near his home town of Monterey. Recently he was elected vice president of the Northeast Association of State Highway and Transportation Officials (NASHTO) for 1982. NASHTO is the regional representative of the American Association of State Highway Transportation Officials. Amidon, a 32-year career employee with the Mass. DPW, received the American Public Works Association Award as one of the country's top ten public works leaders last year.

1950

Carl Davis has retired as a psychologist from Perkins School for the Blind in Watertown, Mass. He writes: "Recent publication - Perkins-Binet Tests of Intelligence for the Blind." The Davises now reside in West Burke, Vermont.

1951

Thomas McComiskey has been promoted to division general manager of the Buffalo Tank Division in Bethlehem Steel Corporation's steel operations department, Bethlehem, Pa. Following his graduation from WPI, he joined the firm as a field engineer in the former fabricated steel construction division. In 1953, he received a military leave of absence to serve in the U.S. Army, from which he was discharged in 1955 as a staff sergeant. After serving as a field engineer for Bethlehem in Pottstown, Pa., McComiskey held various engineering and management positions with the fabricated steel construction division in Chicago, San Francisco, and Los Angeles, as well as in Bethlehem. In 1976, he joined the corporation's Buffalo Tank Division, subsequently holding sales and management positions in Chicago, Towson, Dunellen, N.J., and in Buffalo, N.Y.

1952

Paul O'Neil is presently plant manager for du Pont-Berg Electronics, in New Cumberland, Pa.

1953

George Abdow has opened a new Abdow's Big Boy Restaurant in Westboro, Mass., the twelfth in the chain owned by him and his brother, Ronald. The brothers also own the Ivanhoe Restaurant in Springfield, Mass.

Walter Levine was the author of "New Developments in Spray Nozzles . . . The 038 Story", which appeared in the May-June issue of *Die Casting Engineer*. Presently, he is manager of spray products for Acheson Colloids. Previously, he worked as a research engineer for Worthington Corp. and as project engineer for Edwards Co. before switching to marketing with Dresser Industries, and then to Consolidated Controls. Before joining Acheson in 1979, he moved to Port Huron as engineering manager for Bindicator Co.

1954

W. Richard Byrnes has founded a company called Chemex, Inc., located in Wayne, Pa. The company buys and resells products, primarily in the plastics industries, and offers materials worldwide.

Richard Scott holds the post of senior lead estimator at Mellon-Stuart Co., Pittsburgh, Pa. He previously obtained a state of Rhode Island professional engineer's license.

1955

Since graduation, **Dave Bagley** has been involved in control engineering. In 1971, he joined New England Controls. In addition to specific account responsibilities, he is power systems application specialist for the firm. He is concerned mostly with the Boston area and northern Massachusetts.

Richard Sieron, vice president of R&D at Dual-Lite, Inc., Newton, Conn., wrote "Improve Emergency Light Design With Lumens/Sq. Ft. Method", which appeared in the May issue of *Specifying Engineer*. A member of the Illuminating Engineering Society, Sieron has considerable experience in audio and power engineering and is a frequent lecturer on a variety of lighting subjects. Previously, he was Dual-Lite's chief engineer.

1956

Currently, **Alan Adamson** manages the New York Power Pool planning staff, which plans generation and transmission facilities for the next 15-year period. Before joining NYPP ten years ago, he worked with the Long Island Lighting Co. Besides managing Little League teams, he has been involved with the YMCA Indian Guides.

Joseph Alekshun, Jr. is a graduate student in the School of Engineering and Applied Science at the University of California in Los Angeles. During his career, he has served as a patent attorney for Instrumentation (Draper) Laboratories and as a consultant in environmental areas. In 1978, he returned to electronics, joining Litton Industries in Calfornia.

Robert Allen is the president-owner of Robert S. Allen Associates, Inc., Wichita, Kansas. The company does professional design engineering for the refining, chemical, petrochemical industry. He holds several patents and is listed in *Who's Who in Engineering*.

Christian Baehrecke holds the post of president of the R. L. Whipple Co., Inc., Worcester. He was project manager of the AIA award winning projects at Shepherd Knapp School, Boylston, in 1972 and at Mechanics Hall, Worcester in 1979. He specializes in restoration work and in design/build projects. Active in Paxton community affairs, he also has served on United Way and church committees.

David Becker is program manager for the GTE Sylvania Systems Group, Communications Systems Division, in Needham, Mass. With Sylvania, since 1959, he also did some consulting work for four years for Sanders Associates. He has a PhD in solid state physics from MIT. His work has included space cabin design and much simulation. He has served as chairman of the youth committee at his temple and on the local BSA troop committee.

Ernest Bernstein is engineering manager for the United Technologies Power Systems Division in Farmington, Conn. After graduation, he joined UAC and did nuclear applications research for a space vehicle. He obtained a patent for a once through potassium boiler. Later, he was involved with gas turbines in land-based applications. "Flying has really become a thing with me." He received his license a couple of years ago and is now working on his instrument ticket.

Laurence Blomstrom continues as manager of environmental engineering of the General Electric Space Division in Philadelphia. He holds an MSME from the University of Southern California, and enjoys golf, spectator sports, and community affairs.

Howard Brown holds the position of Dean of the School of Business at Ithaca College, Ithaca, N.Y. Previously, he taught and chaired the Management Department at Southeastern Massachusetts University for five years. He is rebuilding a three manual Mason and Hamlin reed organ at home.

John Burns has spent 25 years with Shell U.S.A.: 12 years with Shell Oil Company in marketing and 13 years in Shell Chemical in marketing and sales management. For the past four years, he has been manager of Shell Chemical's Eastern Region in West Orange, N.J. He is active in the Drug, Chemical & Allied Trades Association of New York and the National Paint & Coatings Association.

Clifford Burwick is vice president of automation planning for Bank of America in San Francisco. Earlier, he was with IBM, Space General Corp., and Shell Oil Co. Outside interests are backpacking, running, tennis, investments, and real estate.

William Casey, an employee of the Badger Co. for 18 years, is now assistant to the vice president of European & Middle East Operations in Cambridge. He has managed several projects for engineering, procurement, and construction of petroleum and petrochemical projects. A member of the Concord Band Association, he plays the baritone horn.

Ted Coghlin, Jr., chairman of the 25th reunion committee, was named as a recipient of the Herbert F. Taylor Award in June. (The Class of '56 had the largest attendance for a 25th reunion to date at WPI.) Ted has been with Coghlin's, Inc., Worcester, the family business since graduation, and now serves as president. During the years, he has been president of Shepherd Engineering and Fred Walters Communications Company, both of which are now sold. Long associated with the BSA, he has served as Council president, and has been involved with Boys' Club work. He was president of the Worcester County Alumni and the Poly Club, as well as the Young Businessman's Association. He is the current president of the Worcester Engineering Society, director of the Mechanics Bank of Worcester, and a corporator of the Worcester Science Museum. Among his awards are the Outstanding Young Man Award from the Junior Chamber of Commerce; the Silver Beaver and St. George Medal from the BSA; and the Honor Service Medal from the Boys Club.

"An on-going hobby is our house, which we built in 1968 and are still finishing," writes **Chris Collins**, who resides in Arnold, Md. He is a fellow engineer for Westinghouse Oceanic Division in Annapolis, and was responsible for sonars on the Navy MK 27 target torpedo. Besides coaching soccer, he is currently on the board of directors of the Greater Arnold Recreation Association. He and his family live on Chesapeake Bay and enjoy sailing, crabbing, and crewing in races.

For the past ten years, **James Colton** has been a maintenance mechanic at Phillips Exeter Academy, Exeter, N.H. Previously, he was with the U.S. Army in Korea, and two years in the Peace Corps in India. Among his outside interests are ballet, baroque music, snowshoeing, and motorcycling.

Bernie Danti writes he is "king" of Bernard R. Danti, Inc., Bedford, Mass. The company is involved with product and machinery development. "Still searching for the perfect wave." Earlier, he was with Millipore, Polaroid, and Pneumatic Scale. Son, Greg, 19, is studying mechanical engineering at WPI.

Robert Delahunt continues as corporate vice president at Polaroid Corp., Waltham, Mass. He and his wife, Jean, have two daughters: Caren, 18, and Susie, 14; and a son, Bob, 17.

Robert Diamond is president and owner of Robert Diamond, Inc., an electronic sales company in Bayside, N.Y. The family has a home at Stratton Mountain in Vermont and enjoys skiing and tennis.

Distance skating and photography are among the hobbies of **Henry Dumas, Jr.**. He serves as vice president of sales at General Scanning, Inc., Watertown, Mass., where he is responsible for the sale of precision electromechanical and electro-optical systems design. He is a full member of Sigma Xi.

After sixteen years with Polaroid, **Gerald Dyer** is now involved in the firm's chemical marketing activity as part of Polaroid's diversification activities. He is programs manager of the Chemicals Division. Previously, he was with National Starch for ten years. Outside interests include tree farming, wood burning stove, and solar energy. His daughter, Cindy, graduated from WPI in biochemistry in 1980.

Robert Edsall writes that he and his wife, Barbara, have two "homemade" children and five adopted children of various racial backgrounds. They live in Perkiomenville, Pa. "on five acres in the woods giving lots of room for our children, four dogs, four cats, and two goats." Currently, he is a supervising engineer engaged in related studies for ballistic missile defense for GE in Philadelphia.

Norman Fischer, a project superintendent for Turner Construction Company, is now building a $38.5 million hospital in Brooklyn, N.Y. for the firm. He plays and teaches the trumpet and is director of church music ministry when at home in Tennessee.

Robert Foisie holds the position of president at Matik North America, West Hartford, Conn. He formerly was with Technical Tape, Inc., Smyth Manufacturing Co., John Marsh Co., and United Technologies. For a number of years he was associated with the West Hartford Boys Football League.

Arthur Freedberg is executive vice president of Newman Data Services in Wayne, N.J.

For the past four years, **Mike Gordon** has served as director of marketing at The Singer Co.-Kearfott Division, Little Falls, N.J. He says, "This is a high technology industry dealing in guidance, navigation, and control systems for aircraft, space, surface and missile systems. Essentially government contracts."

Charles Gunn has worked for United Illuminating Co., New Haven, Conn. since graduation, except for four years at RPI where he was an instructor and obtained his MSEE. Currently, he is senior test engineer for the electric utility, his duties including revenue metering and testing of equipment. He is a member of the Planning and Zoning Commission in North Branford, which he has served as Town Council member and mayor. Hobbies include furniture making and restoring his '34 Ford sedan.

Richard Hajec writes: "My entire career has been devoted to moving air and gases." He's been involved in designing, building, selling, and planning fans, compressors, and exhausters of all sizes and shapes. He likes golf, skiing, hiking, sailing and plain walking.

Still a senior search specialist for Management Recruiters, Inc., **Arnold Hall** also performs engineering consulting and manages his own yacht brokerage, "Seacure," part time. Earlier in his career, he was with Electric Boat Division, Groton, Conn., where he was technical director in a Navy surface effect ship configuration development program. He helped form Hovermarine Transport Ltd., an international shipbuilding company. He sings bass in a chorus and choir, likes carpentry, and is a member of the Watch Hill Yacht Club.

Allan Hamilton, Jr. has been with Western Electric since 1956. He is now department chief of plant and facilities planning engineering for the company in Richmond, Va. He says of his early career, "After my stint in development, I found that trenches were much more to my liking and I am now responsible for the latest expansion at our Richmond works." During the last eleven yeara, he has been associated with the manufacture of printed circuitry. He holds a certificate of completion of the half-marathon from the 1980 Richmond Newspapers Marathon.

Charles Healy is active with community affairs and his church council. Since 1978 he has worked in the Philippines, where he is a project manager for Ebasco Overseas Corporation. For many years he was involved with electric power generation and design with the U.S. Army Corps of Engineers. "Moved 11 times to date."

Just before his present assignment, **Robert Heath** was program manager of the large format camera built for NASA-JSC to be carried on the Space Shuttle. One 9" x 18" frame can cover all of Massachusetts, Connecticut, and Rhode Island, and resolve every house! Heath, director of aircraft systems for Itek Optical Systems, Lexington, Mass., is now responsible for both domestic and foreign programs, building aircraft cameras from 6" to 72" focal length for reconnaissance, surveillance, and mapping. He is a numismatist and has published catalogs of Massachusetts and New Hampshire commemorative medals

Often busy with church work, **Lawrence Horrigan, Jr.** and his wife also enjoy golf. "The Texas climate permits us to enjoy the sport year 'round." After graduation he went with Ebasco Services in New York, where inside 22 years, he rose to construction manager. He then joined Houston Lighting and Power Company in the same position. Currently, he is general manager of the power plant construction department.

John Hyde is a salesman for Avantek in Santa Clara, Calif., doing sales and marketing for high technology companies. He also sails, teaches, and counsels.

John Jolda is director of engineering at Geo. J. Meyer Mfg. Division in West Boylston, Mass. Before joining Meyer in 1967, he worked at Hamilton Standard in Connecticut for 11 years. He teaches evenings at Central New England College.

William Jordan, Jr. serves Synertek, Santa Clara, Calif., as vice president. Pastimes include skiing and tennis.

Kevin Joyce is a partner in Cushman, Darby, & Cushman in Washington, D.C. He is a patent, trademark, and unfair competition practitioner. Ice hockey, horses, and farming are among his outside interests. The Joyces reside in Davidsonville, Md.

Gardening and raising livestock (hogs, chickens, steer) are pastimes of **William Knoblock**, who has a country home near Bowling Green, Ohio. He is project engineer at Cambpell Soup Co., Napoleon. At the present time, he is number 2 man in the engineering department at the largest of the Campbell soup plants, which has 2300 employees.

Hans Koehl serves as trustee of the Connecticut Public Expenditure Council; director of Connecticut Business and Industry Association; and director of Danielson Federal Savings & Loan Association. He is chairman of Spirol International Corporation, Danielson, Conn., where he has been employed since graduating from law school in 1959.

Alan Larsson, who has been 20 years at Raytheon, Waltham, Mass., is now department manager of the airborne department in EEG, Power Tube Division. Wife Dorothy is a member of the technical staff at Mitre. "We divide our time between Sudbury and our vacation home in Moultonboro, N.H." This year, he is commodore of their sailing association.

Last year, **Donald Lathrop** went on a three-week tour of Soviet cities and met with five Soviet Peace Committees. Since his return, he has had extensive speaking engagements. He is professor of philosophy and peace studies at Berkshire Community College, Pittsfield, Mass.

William Lloyd has been with Bethlehem Steel in Johnstown, Pa. since 1956. Today he is mechanical foreman in the coke department. "The flood of 1977 wiped out 80% of our coke operation." The plant is now installing an electric steelmaking facility which will eliminate the coke department, the blast furnaces, and the open hearth department.

Fred Lohrey writes that he is conducting a life-long experiment to see how long someone can play golf without getting any better at it. For 22 years, he has been with IBM near Poughkeepsie, N.Y. and is now advisory engineer. He does circuit and semiconductor logic chip design.

Vilho Lucander, a registered professional engineer, is supervisor of results engineering at New England Power Co., Westboro, Mass. Formerly he taught math in the Worcester Junior College evening division. He is active with the Masons, the Shrine, and town and church affairs.

Louis Marsella holds the post of senior vice president at Guardian Packaging Corp., Newark, Calif. He is concerned with flexible packaging R&D, manufacturing, and general management. In his leisure time, he enjoys flying.

Robert Matchett is president of Fibredyne, Inc., Dover, N.H. The filter cartridges produced by his company are sold to OEM's and stocking distributors for both residential and electroplating applications, usually on a private label basis. New construction is under way to double Fibredyne's capacity. Previously, while with Hammermill Paper, Matchett developed a process (at home) for wet-molding activated carbon filter cartridges and in 1972 incorporated Fibredyne to produce the units. When he finds the time, he likes to golf, fish, and cross-county ski.

"Carpenter's elbow is much worse than tennis elbow," says **Richard McBride**, who is into house renovation and tennis, as well as competitive swimming. With Communications Satellite Corp., Washington, D.C., for 16 years, he is glad that his new assignment as director of project management will keep him more or less desk bound for the near future. "No longer travel all over the world. Thank goodness!"

At present, **John McHugh** is the owner and president of Royal Screw Machine and Waterbury Carbide Tool in Waterbury, Conn. Earlier, he had been a test engineer at Pratt & Whitney Aircraft for five years. He is past president of Smaller Mfgs. Business Association and Exchange Club of Waterbury. He received the Outstanding President's Award for the Exchange Club in 1976.

Joseph Morgan, Jr. serves as senior missile dynamics engineer at Raytheon in Bedford, Mass. Weapons systems experience includes the Sparrow, Hawk, and Sidewinder, missiles and the F-18 fighter aircraft. He heads Pyramid Coins, a part-time Egyptian coins business, which he plans to go into full time after retirement. "The most complete inventory of minor milliemes and piastres this side of the pyramids."

Since 1959, **Henry Nowick** has worked for Monsanto in various assignments in manufacturing and technology. Currently, he is a senior specialist for the firm in Indian Orchard, Mass, He has traveled extensively throughout the world, and entered into some technical negotiations in Russia. At the present time, he is hazardous waste coordinator and the Associated Industries of Massachusetts representative on the Massachusetts Hazardous Waste Facility Safety Siting Council. Recently Nowick studied environmental engineering at Berkeley on a Monsanto technical academic assignment. During the family's year in Fremont, Calif., they visited a number of WPI alumni and enjoyed a variety of side trips.

Joseph Paparella serves as general manager of Latin American Operations for the Foxboro Company, Foxboro, Mass. He joined Foxboro in 1963, and started 12 new overseas operations for the company, traveling over two million miles. His present operation has factories in Mexico, Brazil, and Argentina.

Bruce Paul is director of plant engineering and energy specialist for the USM Machinery Group-Emhart Corp., Beverly, Mass. He has served on the boards of the Beverly Area YMCA and of the Merrimac Valley Textile Museum. In Ipswich, he has been active with the Energy Advisory Commission and the Industrial Development Commission.

William Peterson, an adjunct professor at the College of St. Francis, is also president of William P. Peterson & Associates, Inc., Naperville, Ill. During his career, he has been a "slide rule pushing" engineer; has had a stint in contract research and development; and another in management consulting. For five years he was with the DOE, becoming a regional representative of the secretary, Region V. He was named to the White House speakers program (energy and anti-inflation). In 1979, he returned to his engineering and management consulting practice.

Continuously involved with church activities, **Robert Philhower** has been a ruling Elder in the Presbyterian Church, a Sunday school teacher, and a chairman of several committees. He was director for the Newark Day Nursery and helped to start a day care center in Wilmington. Also, he has received photography awards. A senior specialist engineer for du Pont in Wilmington, Delaware, for the past three years he has been project leader for the Auto-trol Interactive Graphic System.

With Hooker Chemical, Niagara Falls, since 1956, **Halbert Pierce** is now manager of energy conservation. He received the Scoutmaster's Key from the BSA, likes cross-country skiing, and was a former chairman of the Industrial Division of the local United Way.

After spending four years with Standard Oil of Ohio, **Dave Pratt** joined L. H. Waldrip Company, and is still with the firm, although it is now called M.A. Blankenburg & Co. Blankenburg is a manufacturers' representative firm in chemical process equipment covering northern Ohio. Although Pratt runs some 1500 miles a year, he says, "No interest in marathons."

James Prifti is a supervisory mechanical engineer in the Food Systems, Equipment Division at the U. S. Army Natick Labs. in Massachusetts. "We work on improving the methods and equipment used to feed our military troops." He has an MSME from Northeastern University.

Richard Rodin serves as chairman of the science department at Montclair (N.J.) High School. He belongs to the Montclair Society of Engineers and has invented an instructional chemistry game which is marketed nationally. The Rodins have three children.

Richard Rotelli holds the position of department manager for Raytheon in the Missile Systems Division, Bedford, Mass. During his career he has been with Macalaster Scientific Co., Metrologic Instruments, Inc., and a small company in Littleton, Mass. He hopes to write a book in retirement. "I am fascinated with the origins of everyday expressions with obscure beginnings."

Describing himself as a "corporate wanderer" for du Pont, **Anthony Scancella**, now a plant manager for the firm in South San Francisco, says that he previously was headquartered in Connecticut, Tennessee, Pennsylvania, and New Jersey.

The Rev. **Paul Schoonmaker** writes that sons **Peter, '80** and **Stephen, '84** "have followed their father and grandfather to WPI." Recently, with some help from his sons, he built a hybrid electric car. Two years ago he received the "Rosa O. Hall Award" from the American Baptist Churches. In 1977, his book, *The Prison Connection* (Judson Press) was published. He is pastor at the Royersford Baptist Church in Pennsylvania.

Winslow Spofford holds the post of vice president and treasurer at Wachusett Engineering in Holden, Mass. "Have worked from designing looms to testing flow meters at Alden Labs. Also built houses and have been involved with weldments." He is a registered professional engineer and land surveyor in Massachusetts. Also, he is a licensed firearms dealer and enjoys collecting Civil War vintage guns.

George Strom continues as vice president of operations at Speidel in Providence, R.I., a position he has held for two years. Previously, he was with Johnson & Johnson, Procter & Gamble, and Honolulu Iron Works.

Recently, Dr. **Roger Tancrell** lectured at Harvard Medical School. He is principal scientist at Raytheon Research Division in Waltham, Mass., has been granted several patents, and has published a number of technical papers and textbook chapters. Some of his projects were surface acoustic waves for radar; medical electronics; and coded apertures for imaging in nuclear medicine. Early in his career, when he was at MIT Lincoln Labs, he worked on the first transistorized computer. Active with the IEEE, he is on the committee planning the annual Ultrasonics Symposium. During his free time, he teaches basic reading to English-speaking adults who have low reading ability. He helped organize and officially incorporate the all-volunteer reading group.

"I'm the only guy I know who has worked for three different companies without changing jobs," writes **Harry Tenney, Jr.**, of the WPI Alumni Executive Committee. Currently, he is director of marketing for the Polymer Materials Division of Georgia-Pacific in Newark, N.J. Earlier he was with XCEL Corp. (acquired by G-P), and Celanese Plastics, which later became XCEL Corp. He has served as chairman of the West Long Branch Zoning Board of Adjustment; as director of the Shore Area YMCA; and past president of the Northern New Jersey Chapter of the WPI Alumni Association.

Edward Wiot serves as coordinator of fuel cycle licensing for NUS Corporation in Rockville, Md. During his career, he has been a consulting nuclear reactor safety engineer specializing in nuclear reactor safety and licensing. Also, he has been involved in other aspects of the nuclear fuel cycle. Among his outside interests are singing with the Oratorio Society of Washington, D.C. and with the Montgomery County chapter of the Barbershop Harmony Society. Wife Lou is a member of the Sweet Adelines.

Thomas Wright continues as senior systems engineer for IBM in Montoursville, Pa. He spent over seven years in management positions with Western Union, "then switched from Morse Code to computer code and have been in systems engineering with IBM ever since."

1957

After 22 years of working as an engineer, **Michael Spiegel** decided to get his PhD in order to teach at a university. He enrolled at Western Connecticut State College and is now at Oregon State University in Corvallis. During his engineering years, he also pursued a sideline of raising, training, and showing horses, so his new direction in school is in animal science and more specifically genetics and reproductive physiology. The Spiegels have three children: Jessica, 9; Zachary, 6; and Caleb, almost 5.

1958

C. Stewart Gentsch is now division president of the Roller Chain Division of Rexnord, Inc., Springfield, Mass. He first joined the company in 1958 as a sales correspondent. He was factory manager of the bearing division in Downers Grove, Ill. from 1971 to 1972, and was promoted to operations manager of the Roller Chain Division in 1972. He became president of the division in 1978. Earlier, he attended the Carnegie Mellon University Program for Executives.

1959

Robert Berg has been elected president and chief executive officer of Wesley Manufacturing Company, Inc., Scottdale, Ga. Earlier, he had senior management positions with Scovill, Inc., American Standard Inc., and Rexnord, Inc. He holds an MBA from the University of Chicago. Wesley is an international marketer and manufacturer of material handling equipment including Pallet Mule, Pallet trucks, and the Crusader electric vehicles.

Frank Cohee holds the position of director of quality assurance and management systems at Eldec Corp., Lynnwood, WA. He has an MBA from Harvard.

Michael Hertzberg, president of Michael A. Hertzberg Consulting Engineers, Inc., Waitsfield, Vt., has been appointed a director of the American Consulting Engineers Council Research and Mangement Foundation in Washington, D.C. He will also serve as a vice president of the Council, and will oversee research projects of the Foundation. Of particular current interest is a major national study of building regulations. The analysis, which is being conducted for the National Institute of Building Sciences, Washington, D.C., will document the proliferation of federal codes, rules, etc., which affect the design and construction of new and renovated buildings. Hertzberg's Waitsfield firm specializes in mechanical, electrical, alternate energy and energy conservation engineering services. A past president of ACEC/Vermont, his firm received awards for engineering excellence from the state consulting engineering organization in 1975 for the lighting and mechanical engineering design of the Berlin branch of the Howard Bank, and in 1978 for the mechanical engineering design of the domestic hot water generation and distribution systems at the Vermont State Hospital in Waterbury

John Wolfe was recently named senior vice president of North American operations for EG&G Sealol, Inc. In his new position, he will be responsible for all U.S. operating divisions as well as EG&G Sealol Canada. Previously, he was vice president and general manager of the Engineered Products Division. EG&G Sealol, based in Warwick, R.I., manufactures and markets mechanical seals, valves and bellows devices. It has three plants in the U.S. and manufacturing facilities in ten other countries.

1960

The **William Bontas** make their home in Phoenix, Md. Bill is with the Federal Bureau of Air Quality and has recently seen his responsibilities expanded into other environmental areas. One of the Bontas' two children is a budding track star.

Don Cloud of Guilford, Conn. has sold out his first condo development and is developing another.

Donaldson Dow is a senior engineer at AIDE in Richmond, Va. His daughter, Julie, who has finished junior college, was married in June.

Ken Halvorsen serves as a senior supervisor with the Naval Ship Engineering Center. Recently, he was associated with the Cruise missile program. The Halvorsens have five children and a son in medical school.

Ivan Kirsch has completed 17 years at Analogic in Wakefield, Mass. His son, Robert, just graduated from MIT and is going to the UMass Medical School. His middle daughter, Ellen, is a junior at Framingham State. His younger son, Stuart, is a sophomore at Harvard.

Dick Kischell is responsible for radio and TV transmission engineering for Southern New England Telephone.

Pete Lajoie holds the position of national sales manager for Disc Instruments, a firm specializing in optical encoders for the OEM market. He travels a great deal while building a national sales force for the fast growing business. The Lajoies are located in Mission Viejo, Calif.

David Westling serves as a sales representative at National Standard Co. in Santa Fe Springs, Calif.

1961

Hank Allessio continues as supervisor in the New York office of Hayes/Hill, Inc. The firm provides corporate long-range strategy, marketing and new product development, acquisition planning, and executive compensation. "Automotive components have been a 'pet.'" His various assignments have taken him around the world, and *Forbes*, *Business Week*, and the *Wall Street Journal* have used quotes from several of his speeches. About twice a year Hank and his family get together with several other WPI alums and their families for an informal reunion.

Last year, **Bob Beaudry** was named director of the design office for the Federal Highway Administration, Delmar, N.Y. Leisure time activities include skiing, biking, woodcraft, the theater, and travel.

William Calder III, manager of corporate quality assurance at the Foxboro Company, is the vice president-elect of the Standards and Practices Department of the Instrument Society of America (ISA). His most significant professional involvement has been in design problems associated with the use of Foxboro products in explosive atmospheres. This specialty has brought about a patent, worldwide travel, teaching for the ISA, and representing the USA on several international committees. In 1975, he was selected Young Engineer of the Year at Foxboro. He has two PE licenses. The Calders have four children, and have restored an old New England house.

A year ago, **Joe Calzone** was promoted to manager of advanced engineering at GE in Utica, N.Y. Except for a term in the Army, he has been with GE since 1961. In his spare time, he enjoys skiing, fishing, and racquetball.

Since 1975, **Joseph Carpentiere** has been self-employed as a software consultant. Recently, he formed Decisions, Inc., a consulting firm with two partners and "expanding." Besides their two daughters, Marcella and Christa, the Carpentieres have a Colombian son, Carlos, who joined them as an AFS exchange student in 1974, and who now holds a degree from the University of New Haven. Besides serving as chairman of the Planning & Zone Commission, Carpentiere has taught religious education.

Currently, **Richard Davis** is involved in strategic planning for the Military Products Group and is product marketing manager for the military microprocessors and peripherals at Intel, which has just relocated to the Phoenix, Arizona area. Earlier, as editor for the electronics magazine "Micro Waves", he won a Neal Award, the trade press equivalent of a Pulitzer prize, for his article on Electronic Countermeasures. While serving as executive editor for EW Communications, he received his MBA from Pepperdine University in California.

Edward Desplaines is now employed by C-E Incorporated, a manufacturer of fossil fired power boilers and nuclear reactors. Previously, while chief engineer of the International Boiler Works Co., he designed some unique tubular heating boilers from scratch. Flying, hunting, and fishing are among his pastimes.

After a stint with GE, **Nino Dipilato** joined his present employer, IBM, in 1965. During his IBM career he has had assignments in Germany, Fishkill, N.Y., and Charlotte, N.C.

Currently, **Kenneth Engvall** serves as a selectman in Boylston, Mass. For a number of years, he was on the town finance committee. He is involved with a small civil engineering-land surveying firm doing varied things from straight survey to sanitary design and from site planning to subdivision design.

Robert Fitch holds the post of business systems manager at Collyer Insulated Wire, Lincoln, R.I., where he is developing computerized manufacturing systems. "Oh, yes. I once took a first class 'red-eye' from LA to NY. In the seat in front of me was Paul Newman. We both slept all the way!"

Bill Gill enjoys the California lifestyle and most outdoor activities including camping and hiking. Active with the youth soccer league and the BSA, he also has been president of the local section of the ASCE and chairman of the California State Council of Civil Engineers. He helped co-found Gill & Pulver Engineers Inc., (water development, etc.), which he serves as president.

Martin Gordon heads up the patient monitoring group at Analogic Corp., a firm he joined four years ago. Previously he was with Transition Corp., Digital Equipment Corp., and EG&G. He is located in Wayland, Mass.

Stuart Kazin was recently named general manager of the Burlington Center of Foxboro Analytical in Burlington, Mass. He joins Foxboro from Dynamics Research Corporation in Wilmington, where as general manager of the Precision Measurement Division, he was responsible for marketing, engineering, manufacturing, quality, service, and controller functions. Previously, he was a group leader for the MIT Instrumentation Laboratory of Cambridge, Mass. In 1967, he received his MS in aeronautics and astronautics from MIT. A former lieutenant in the U.S. Army Signal Corps, he is married and the father of two children.

Digital Equipment Corporation, Maynard, Mass., has announced the promotion of **Ward MacKenzie** to vice president of the Technical Volume Group. This new group is comprised of Digital's Technical OEM and Microcomputer Groups. MacKenzie also becomes a member of Digital's Operations Committee. He started at the firm in 1967 as DECsystems-10 operations manager. He has held a number of posts in Digital's U.S. and European operations, including that of European marketing manager, and later, that of European manufacturing manager. Prior to his recent promotion, he was technical OEM Product Group manager.

1962

Bruce Dudley continues with the Rome Air Development Center, at Griffiss Air Force Base.

John Rupprecht holds the post of president of Sullair of New Mexico in Albuquerque. The company sells industrial, mining, and construction equipment in New Mexico, West Texas, and in Juarez, Mexico.

1963

Stuart Batstone is senior vice president of The Giving Tree in Houston, Texas. He has a new position with a franchise opening Christian bookstores in major malls nationwide. He has an MA and a master's of divinity degree.

Harry Hoyen is currently in the Research Labs at Eastman Kodak, Rochester, N.Y. During the past year, he was invited to deliver a plenary lecture at an international symposium in Varna, Bulgaria, as well as in the capital, Sofia. He has travelled extensively in Europe, having given papers in England, France, Belgium, and Switzerland. In July, he was general chairman of an international symposium in Lake Placid involving over 100 scientists carrying out research in photographic science and light induced effects at semiconductor interfaces. Technically, the meeting was a resounding success, with approximately forty presentations and with representation from over thirteen countires. The social highlight of the meeting was a wine-tasting atop the Olympic ski jump.

John Machonis, Jr. has been promoted to the newly-created position of manager of new polymers R&D for Chemplex Company, Rolling Meadows, Ill. Previously, he was assistant manager. In his new post, he will be responsible for all new polymer research activity for the company and will continue to direct the research efforts for Plexar, a proprietary adhesive resin. He started with Chemplex in 1968 as a senior research engineer. He, his wife, and two children reside in Schaumburg, Ill.

Presently, **Robert Mellor** serves as district superintendent of the North Shore District of the Massachusetts Electric Co.

Charles Menzigian, a planning engineer for Western Electric in North Andover, Mass., is presently on a three-year temporary assignment with AT&T Long Lines in El Segundo, Calif.

1964

Peter Baker serves as an alcohol counselor at Howard Mental Health in Burlington, Vt. He holds an MBA from the University of Cincinnati.

Recently, **William Kaszeta** was elected to the board of directors of the Radiation Division of the American Section of the International Solar Energy Society.

Sterling McFee is employed as manager of packaged products production at Marathon Oil Company, Robinson, Ill.

Jack Ryder holds the post of chief engineer at Maier & Assoc. in North Canton, Ohio.

George Spires works as a senior mechanical engineering consultant at Brown & Root in Houston, Texas. He has an MBA from Northeastern.

Frank Stone is vice president of engineering for Automata in Reston, Va.

1965

►*Married:* **Desha Beamer** and Maureen Delong on February 28, 1981 in San Francisco, California. **Al DiPietro, '66** served as best man. Al and his wife Karin flew in from Pennsylvania to attend the wedding.

At the present time, Maj. **David Coombe** is a student at the U.S. Army Command & General Staff College in Ft. Leavenworth, Ks.

U.S. Air Force Major **Gene Dionne** has been reassigned from SAMSO-Space and Missile Systems Operations in Redondo Beach, Calif, to a tour at the Air Force Command and Staff College in Montgomery, Alabama. From there, Gene, his wife, Peg, and their son, Jeremy, will move to his next assignment at the Pentagon.

Dr. **Bennett Gordon, Jr.** has been promoted to associate professor of mechanical engineering at WPI.

Pat Moran writes that about a dozen WPI alums attended a cookout held in honor of the **Paul Covecs', '64** return from their recent ten-month sailing adventure. (They sailed in their Morgan 46-ft. ketch from San Francisco to Boston.) The celebration was held at the home of **Bill Shields** in Manomet, Mass. in July. Among those attending besides the Covecs were **Dave McCaffrey, Walt Lankau, Duke Gale, Dick Ryczek**, and **Stan Szymanski**, all of the Class of 1964. Also, from the Class of '65 were Host **Bill Shields, Pat Moran, Jim Fee**, and **Paul Giusti. Malcolm MacGregor** and **Mike Portanova** represented '66. According to Moran, the Shields' house is similar to "an updated Higgins House."

Gerald Morris has been elected vice president and treasurer of the Foxboro Company, having come from a post as assistant vice president and director of corporate planning at Textron, Inc., Providence, R.I. Earlier, he had served as Textron's corporate assistant treasurer. Foxboro's new chief financial officer received his MBA from Harvard in 1970. He belongs to the North American Society for Corporate Planning. The Morrises have two daughters and a son.

Dr. **Richard Reynolds**, who has his PhD in oceanography from the University of Hawaii, is now an oceanographer for the National Weather Service (NOAA) in Washington, D.C.

Dr. **Bruce Yung**, who received his PhD in biomedical engineering from the University of Virginia this year, is currently a resident engineer at Armak Co., McCook, Ill.

1966

Ron Hayden continues with New England Controls, which he joined in 1976. Previously, he was an assistant sales manager with Fisher Controls with ten years of control application experience. His specialty is digital systems. His profile appeared in a recent New England Controls promotional brochure.

John Kopchik works as strategic planner and director of United Vintners in San Francisco. He and Diane have two children and live in Walnut Creek.

1967

►*Married:* **Alan W. Couchon** to Paula L. Smith in Milford, Connecticut on May 16, 1981. The bride has a BS degree from Southern Connecticut State College and is a bookkeeper. Her husband serves as a manufacturer's representative.

Joseph Cieplak continues as product manager in the Measurment Systems Division at ACCO Industries, Bridgeport, Conn. This year he received his MA in communications from Fairfield University.

David Collette of South Hadley, Mass. has been selected by District No. 2 Prudential Board as water commissioner. A registered professional engineer, he has worked as a maintenance construction supervisor at Monsanto Co. in Springfield since 1977. He will serve in the post until the next district election in February.

Allen Griswold is product manager for Ocean Research Equipment, Inc., Falmouth, Mass.

Mitchell Koziol holds the position of president at Mitchell Machine Screw Co., Glastonbury, Conn. He and Hannelore have three children and live in Colchester.

Jack Rahaim is now corporate manager of personnel administration at Digital Equipment Corporation in Maynard, Mass. He is responsible for providing quality data methods and support procedures.

Thomas Ricchi serves as a computer applications engineer at GE Ordnance Systems, Pittsfield, Mass.

1968

Robert Bradley serves as vice president of manufacturing at OZ/Gedney Co., Terryville, Conn. The firm is a subsidiary of General Signal

Dr. **Richard Formato** continues as principal engineer in electromagnetics at Data General in Westboro, Mass. In March, he received a U.S. patent on an apparatus and method for measuring the velocity of a moving dielectric (poorly conducting) material. The invention constitutes a means for measuring the velocity of a moving dielectric material from which a flow determination may be made. In May, he was issued another patent on an improved automotive ignition system. The invention is a non-mechanical system whereby the high voltage pulses in a multi-cylinder spark-fired engine are selectively distributed to the individual spark plugs in time with engine operation. Both inventions are being evaluated by industry and are slated to be subjects of upcoming magazine articles. Dr. Formato is also associated with Orion Associates of Shrewsbury, Mass.

Paxson Gifford was recently appointed as manager of trading at Texaco Oil Trading and Supply Company in Harrison, N.Y. He has a master of management degree from Northwestern (Ill.) University. In 1968, he joined Texaco as a process engineer in the U.S. refining department at Port Arthur, Tex. After assignments in Eagle Point, N.J., Lockport, Ill., and in New York City, he received several promotions, and was named a senior coordinator in 1979.

Dr. **Roger Pryor** has been named manager of physical sciences for Pitney Bowes corporate operations. He joined the company in 1976 as senior physicist for its mailing systems division. He went with the advance mailing machine and meter systems department in 1978, and was appointed group manager of that department in 1979. Dr. Pryor, who has had several articles published in technical journals, received his master's and doctorate degrees in physics from Pennsylvania State University. He belongs to the American Physical Society, Sigma Xi, and the New York Academy of Sciences.

Richard Scaia is district manager of the Torrington Co. in Dayton, Ohio.

Did you happen to catch the picture of **Marshall Taylor** on the back cover of the August 3rd issue of *Business Week*? Ryder, the big name in truck rentals, was featured in a Continental Bank ad, and two Ryder executives (including Taylor) were pictured. Marsh holds the post of vice president and treasurer of Ryder System, Inc.

Michael True holds the position of vice president at Maine Building Specialties, a division of Overhead Door Company in Portland, Maine.

Ken Turnbull serves as fire safety engineer at Texaco, Houston, Texas.

Malcolm Wittenberg is an attorney with Limbach, Limbach & Sutton in San Francisco. He holds a Juris Doctor degree from George Washington University. The Wittenbergs and their three children reside in Cortemadera.

1969

Alfred Freeberg is now at the Naval Postgraduate School in Monterey, Calif.

This fall, **Stephen Legomsky** joined the Washington University School of Law faculty as an assistant professor. He teaches courses in torts, criminal law, and restitution, as well as a seminar on immigration law. Since April of 1980, he has served as chief of Division II, Central Legal Staff of the U.S. Court of Appeals for the Ninth District, San Francisco. His responsibilities included general supervision and editorial review of all written work of the legal staff assigned to Division II. He also drafted bench memoranda and proposed opinions and performed varied administrative duties. Previously, he was court law clerk for the U.S. Court of Appeals, Ninth Circuit, from September 1979 until April 1980. In 1977, he received his JD degree from the University of San Diego, graduating first in a class of 237. After graduation, he studied at Oxford University, where he was in residence from 1977 to 1979. He expects to receive his PhD in comparative immigration and comparative administrative law next year. He is an associate in the Society of Actuaries, and was employed earlier by John Hancock Mutual Life Insurance, Boston, and by the Pacific Fidelity Life Insurance Company, Los Angeles.

Michael Nowak is now analytical group leader for Sinclair & Valentine in West St. Paul, Minn.

Dr. **Mahendra Patel**, P.E., was recently elected to the office of treasurer by the Engineering Societies of New England. He is a mechanical engineer in the Engineering, Planning and Research Department at Boston Edison Company, where he has been associated with engineering, design, construction and management of projects in fossil fueled power plants since 1969. Also, he has been involved with studies in air pollution control, environmental regulations, and fuels. Active with the Boston section of the ASME, he currently serves as chairman of honors and awards in ASME's Region 1.

Robert Perkins works as a senior systems programmer at Guy F. Atkinson in South San Francisco, Calif.

1970

Dr. **Maria Allo** is assistant professor of surgery at the University of Colorado Health Sciences Center in Denver. She received her MD from the University of Michigan Medical School.

David Brown has been elected vice president of engineering at Rodney Hunt Co., Orange, Mass. He joined the company in 1971 as a project engineer in the Water Control Equipment Division. In 1977, he became chief product engineer and in 1978 was promoted to manager of Water Control Equipment Engineering. Last year, he was appointed director of engineering with overall responsibilities for Rodney Hunt's application engineering, quality assurance, field service and product engineering. He is also a member of the company's executive group. Currently, he is completing work for his MS in engineering management at WPI. The Browns, who have a son and daughter, live in Holden.

John Galvin was recently promoted to senior systems consultant within the systems organization at State Mutual in Worcester. He became associated with the firm as an actuarial assistant in 1970, and was named systems analyst in 1972. In 1976, he was promoted to senior systems analyst, and in 1978, was named systems consultant. He has an MBA from Clark University.

William Hillner is now senior project engineer at Exxon Co., U.S.A. in Houston, Texas.

Kalvin Ngoon is a senior systems analyst at Syntex, Inc., Palo Alto, Calif.

1971

►*Married:* **Daniel E. Demers** to Judy A. Ouellette on June 6, 1981 in Marion, Massachusetts. The bride, a home economics teacher at the Greater New Bedford Regional Vocational Technical High School, graduated from Framingham State College. Her husband is employed by the Aircraft Engine Group at GE in Lynn.

►*Born:* to Mary and **David A. True** a son, Joshua David, on November 18, 1980. In June, True was named as chief chemist at Narragansett Electric Co., Providence, R.I. Previously, he was chief chemical technologist for New England Power Co., Brayton Point Station.

J. Lee Cristy works as a quality engineer at Litton-Amecom in College Park, Md. He has been elected recording secretary by the Order of the Sons of Italy in Laurel.

Dr. **George Gardner** holds the post of clinical automation officer at Walter Reed Army Medical Center in Washington, D.C. In 1979, he received his PhD from WPI, after receiving his MA from Assumption College.

Michael Gitlen serves as a senior auditor at Kaman Corporation in Bloomfield, Conn.

Charles Harrison continues as a methods and procedures analyst at Union Camp Corporation in Wayne, N.J.

Capt. and Mrs. **Chris Johnson** are now stationed on the Presidio in San Francisco, Calif. Chris is the chief of quality assurance at Letterman Army Institute of Research.

John Landahl holds the post of project manager, NATO Project Section, Corps of Engineers, Europe Division. Located in West Germany, he is presently working as a civilian employee managing the design of various facilities for NATO forces in Europe. He and Nancy have two children.

Scott McCandless is a partner in HMM Associates, Waltham, Mass. He has a master's in urban affairs from BU.

Dr. **Richard San Antonio** is now an internist and cardiology fellow for the U.S. Army at Brooke Army Medical Center, Fort Sam Houston, Texas. He and Pamela have two children.

Stephen Sergio, a U.S. Army captain stationed in West Germany, was married on April 11th. He has an MS in chemistry from the University of Delaware and an MBA from Florida Institute of Technology.

Dr. **Noel Totti III** is a pulmonary disease fellow at Barnes Hospital in St. Louis, Missouri. He writes: "Finally out of the Air Force. Have become board certified in internal medicine." The Tottis have two children and reside in St. Louis.

Currently, **Donald Usher** holds the post of regional representative at Babcock & Wilcox in Houston, Texas. To date, He and Annie have two children.

Steve Watson serves as a controller for DEC in Geneve, Switzerland. He received his MBA from Harvard.

Currently, **Robert Wright** is employed at Central Labs in Worcester.

1972

►*Born:* to Mr. and Mrs. **Neil C. Herring** a daughter, Kate, on Valentine's Day, 1981. Last year, Herring was elected vice president of finance at Path Lab., Inc., Portsmouth, N.H.

John Burke is a hydraulic engineer for the U.S. Bureau of Reclamation in Boulder City, Nevada.

Robert Dorf continues as a logistics plans officer with the U.S. Army. He is located with the HQ Atlantic Command in Norfolk, Va. He and Deborah, who reside in Virginia Beach, have two children.

Bill Kamb still works for Turner Construction in Cleveland.

1973

►*Married:* **Stephen P. Cole** and Susan J. Geist recently in Roslindale, Massachusetts. Mrs. Cole graduated from Northeastern-Tufts Dental Assisting Program and is a dental office manager in West Roxbury. The bridegroom was an employee of Hartford Hospital.

. . . . **Peter C. Conti** to Carol Latta on June 27, 1981 in Fairfax, Virginia. The bride, a dental hygienist, graduated from the University of Vermont School of Dental Hygiene in Burlington. Her husband is a geo-technical engineer for Stone & Webster Engineering Co., Cherry Hill, N.J. . . . . **John F. Stasaitis** and Ann M. Brown in Shrewsbury, Massachusetts on May 30, 1981. Mrs. Stasaitis, who works at the University of Massachusetts Medical Center, Worcester, graduated from Providence College. The bridegroom is with Stone & Webster, Boston.

Peter Bonaccorsi is employed with the planning and engineering division of Fairfax Co. Water Authority in suburban Washington, D.C. A professional engineer, he also has a master's degree from George Washington University.

Formerly with Digital Equipment Corp., **Ron Bohlin** recently joined the management consulting firm of McKinsey & Company. He now works in McKinsey's Stamford, Conn. office, and spends a lot of time in the firm's New York City office.

Thomas Ferguson serves as a senior formulations engineer at Eli Lilly & Co., Greenfield, Indiana. This year he received his PhD from Iowa State University.

Bruce Foster is a development engineer with GE Ordnance Systems, Pittsfield, Mass.

Greg Stamper continues as a pilot with United Air Services. He is located in Charlottesville, Va.

John Weigele is a medical student at the School of Medicine, University of Pennsylvania, Philadelphia. He holds a PhD in biochemistry from the University, and expects to receive his MD next May.

Michael Zack holds the position of management consultant at Touche Ross & Co., Boston. He has an MBA from Northwestern.

1974

Born: to **Gretchen Lapidus Lobo** and **Ricardo Lobo** a son, Rodrigo Javier, on April 22, 1981. The Lobos still work for the Metropolitan University in Mexico City.

Alden Bianchi has resigned his position as an associate in the Washington, D.C. law firm of Rivkin, Sherman & Levy to open a practice of his own in Worcester. Presently, he is located at 390 Main St., Suite 659.

Gary Carver is a member of the research staff at Western Electric, Princeton, N.J. Last year, he received his PhD in optical scienccs from the University of Arizona.

During the past few months, **Steve Dacri** has appeared with the Mills Brothers in Denver, with Tony Orlando at Caesers Palace, Atlantic City, N.J., and on the Mike Douglas TV show. In October and November he will entertain at the Magic Castle in Hollywood, Calif.

The White House has named **William Delphos** vice president of operations and marketing of the Overseas Private Investment Corporation (OPIC). As part of this newly-created position, Bill will be responsible for the operations of the insurance and finance departments, marketing, and operations strategic planning. OPIC is the self-sustaining government agency that provides political risk insurance and finance services to encourage U.S. private investment in more than 90 developing nations. During the past two years, the Corporation has issued $1.929 billion in insurance and made commitments for project financing totalling over $244 million. In fiscal 1980, OPIC's net income was $65.8 million. Prior to joining OPIC, Bill held a number of key management positions with Gould Inc. of Chicago, most recently that of managing director-international for the Industrial Products Group.

Charlie Dodd has been promoted from manufacturing engineer V to the position of senior manufacturing engineer at Hitchiner. He joined Hitchiner in 1977 after having been employed with Connecticut Investment Casting Company.

Donald Gross, who is stationed at Homestead AFB, Florida, is a captain in the Air Force.

Robert Hodgson holds the post of marketing specialist at Wang Laboratories in Lowell, Mass. He has an MBA from Amos Tuck School, Dartmouth College.

David Lapre serves as manager of product design and development at American Can Co., Greenwich, Conn.

Dr. **Mark Mahoney** is an emergency room physician at Parkwood Hospital in New Bedford, Mass. He holds an MD from the University of Connecticut. He and Kathryn have one child and reside in Mattapoisett.

William McBride, a project engineer in instrumentation for the Engineering Division of VECO, Inc., Anchorage, Alaska,, has just spent ten months working at Prudhoe Bay on contract to ARCO-North Slope Projects Quality Assurance Group: Functional Checkout Group. He spent the summer building a cabin (alternative energy-technology dwelling) in Oregon. In September, he was slated to spend a week back East.

Harvey Neilson, who received his MBA from BU this year, is presently with IBM Corp., Burlington, Vt.

Stephen Rubin continues as president of Computer Control Systems, Inc. in Norton, Mass.

Michael Tanca is now a coal gasification process development unit project engineer for Combustion Engineering of Windsor, Conn.

Dr. **Stephen Thibodeau** has been selected by the science committee of the American Association for Clinical Chemistry to share the 1981 Young Investigator Award for his research involving breast cancer therapy. He was cited for his development of a hormone receptor assay that will aid physicians in predicting the success of a mode of therapy for breast cancer patients. He was recently a postdoctoral fellow in the clinical chemistry training program at the Mayo Clinic. Along with others at the clinic, he developed a new test which is a modification of several existing hormone receptor assays. In the new test, the concentration of both the estrogen and progesterone receptors are measured simultaneously and used to establish the hormone-dependency of the tumor. The Young Investigator Award, sponsored by Boehringer Mannheim Diagnostics, Inc., consists of a scroll and honorarium. Currently, Dr. Thibodeau is associated with Children's Hospital, Denver, Colorado.

Mark Wendell works for Dell Mfg. Co., Farmington, Conn. He has an MSEE from WPI. The Wendells reside in Avon.

1975

►*Married:* **Geoffrey R. Chester** to Lauren L. Adkins on May 16, 1981 in Rowayton, Conn. The bride holds a BA from Fairfield University and an MA in demography from Georgetown Graduate School. Currently, she is with the Population, Health, and Nutrition Department at the World Bank in Washington, D.C. Her husband works for the National Air and Space Museum at the Smithsonian Institution. . . . . **James K. Garvey** and Lynelle M. Kolwicz in Danbury, Connecticut on April 25, 1981. Mrs. Garvey graduated from Danbury High School and is a secretary at Consolidated Control Corp., Danbury. The groom serves as an engineer and group supervisor for Perkin-Elmer Corp., Optical Technology Division, also located in Danbury. . . . . **Walter H. Wiegert, Jr.** to Regina R. Peretti on June 13, 1981 in West Springfield, Massachusetts. The bride has a BS in biology degree from Westfield State College. She is with the Old Saybrook Press, Saybrook, Conn. Her husband is a metallurgist for United Nuclear Corp., Norwich. He has an MS degree in metallurgy from WPI.

►*Born:* to Santa and **Norton Bonaparte, Jr.** a son, Norton Nathaniel III, on May 23, 1981. Bonaparte serves as director of program development with the American Society for Public Administration in Washington, D.C.

Marty Burgwinkle is with Turner Construction, Cleveland, Ohio.

On June 22, **Mark Drown** joined Coordinated Systems, Inc., a consulting engineering firm in West Hartford, Conn.

Peter Hatgelakas is a geologist-geophysicist with Peoples Natural Gas of Pittsburgh. Currently, he is drilling gas wells in Pennsylvania.

Gordon Henley serves as a system engineer at Intermetrics, Inc., Cambridge, Mass. He and Carol Ann live in Sudbury.

Leo Letendre is a senior research chemist at Monsanto Agricultural Products Co., St. Louis, Mo. This year, he received his PhD in chemistry from Harvard.

Frank Sundermeyer is a design engineer at Siemens Medical Systems, Cheshire, Conn.

Jeffrey Yu holds the position of general manager for King Machinery, Inc., Compton, Calif.

1976

►*Married:* **Lloyd A. Boyden III** and Patricia L. Gancarz on July 18, 1981 in Holden, Massachusetts. The bride, a library clerk, attended the University of Massachusetts. Her husband works for the Newport News Shipbuilding, Atomic Power Division. . . . . **Bruce G. Haffty** and Theresa M. Malloy on June 14, 1981 in Worcester. The bride, a registered nurse, graduated from St. Vincent Hospital School of Nursing. The bridegroom is a medical student at Yale University, New Haven, Conn.

►*Born:* to Ellen and **Michael Menesale** twin daughters, Sarah Ann and Ann Marie, on March 1, 1981. Menesale, who has an MBA from the University of New Haven, is employed as a wire rope engineer at U.S. Steel Corp., Trenton, N.J. . . . . to Kathleen and **William Ruoff** a son, Bryan Millard, on June 2, 1981.

Charles Bohling works as a senior analyst at Weathercaster, Salt Lake City, Utah.

Susan Valinski Bryan is a process engineer for Uniroyal Chemical in Naugatuck, Conn. The Bryans have one child and live in Middlefield.

Continuing with Turner Construction, **John Dewine** is now with the firm in Charleston, West Virginia, where he holds the post of project superintendent.

Stephan Divoll serves as a product specialist at Texas Instruments in Attleboro, Mass.

John Hamilton continues with Raymond International Builders in Saudi Arabia. He is a project manager for the cement mortar lining of steel pipes used for the Riyadh water transportation system. The twin pipe line will extend from the port city of Jubail and carry desalinated sea water to the capital city of Riyadh 471 KM away.

Kevin Hastings was recently promoted to engineer at Northeast Utilities (NU) in Hartford, Conn. He joined NU in 1979 as an assistant engineer and was named associate engineer in 1980. Currently, he is studying for his MS degree in management at the Hartford Graduate Center.

Sulekh Jain holds the position of technical director at Beaumont Well Works Co., Houston, Texas.

Peter Krupinsky, a graduate of Loyola Law School, is a public defender for Los Angeles County in California.

M. J. McGuire is a marketing consultant at GE in Bridgeport, Conn.

Kathleen Morse now holds the position of principal software engineer at Digital Equipment Corp., Nashua, N.H. "Just bought a house. Finally got a sportscar—an Alfa-Romeo. Have traveled to Australia and Europe for work."

Charles Moulter works as a quality control engineer in system testing at GE in Pittsfield, Mass.

Delmar Salomon heads R&D at Esquim, S.A., Cuernavaca, Mexico.

Peter Tordo is a senior loss prevention representative for Liberty Mutual Insurance Co., Norwich, Conn.

Andrea Tyson has been named market manager of professional services for the Carlson Group, Inc., an international engineering, architectural and construction management firm headquartered in Cochituate, Mass. Her responsibilities include development, management, and promotion of the professional services market of the various Carlson companies. A registered landscape artist, she received her BS from UMass and her MSCE from WPI. She has lectured for the ASCE, WPI, and for the Center for Professional Advancement in East Brunswick, N.J. Also, she has been a visiting critic and lecturer at Harvard University, Radcliffe Institute. At Carlson, she has been involved in all projects, including major national and international industrial, commercial, and medical facilities.

1977

►*Married:* **Daniel A. Funk** and Jill Sampson of Cincinnati, Ohio last November. In April, they traveled to Switzerland, where Dan studied under a surgeon who specializes in fracture fixation with implantable devices. In June, he returned to this country to receive his medical doctor degree from the University of Cincinnati. In July, he started his residency in orthopedic surgery at the Mayo Clinic. . . . . **Kim M. Mohanty** and Carolyn C. Meinecke on July 25, 1981 in Stillwater, Minnesota. The bride, a teaching assistant, is studying for her MS degree as an oboist at the State University at Stony Brook, N.Y. She received her BA degree in music in 1978. Her husband is a scientific computer programmer on the Isabelle Project at Brookhaven National Laboratory. He plans to study for his doctorate in physics. . . . . **Linda S. Weiss** and Paul. B. Makowski in Fairfax, Virginia on July 25, 1981. The bride received her MSCE from Virginia Polytechnic Institute and State University this year. The groom has a BSCE from Northeastern and works for the Illinois Institute of Natural Resources, State Water Survey Division, Champaign, Ill.

Currently, **Joan Adamaitis** broadcasts news beginning at 5 a.m. for radio station WHEB, Portsmouth, N.H. Formerly, she worked for a Worcester radio station and taught high school in the Worcester area. (She holds teaching certificates in English, French, Spanish, and Russian.) Widely traveled, she was once a governess for a Massachusetts couple who taught at the Anglo-American School in Leningrad.

Raymond Baker is a chemical engineer for utilities at Corning Glass Works, Corning, N.Y.

Mark Breton works as an estimator at Gilbane Building in Clinton, N.J.

Richard Clapp has taken a permanent transfer from du Pont's Engineering Services Division-field engineering section to the Engineering Services Division-consultant section in Nashville. He is responsible for supplying materials engineering assistance to du Pont plants in Louisville, Ky., Montague, Mich., and Belle, West Virginia. "Phi Kappa Theta grads are about everywhere." The plant manager at Montague is a WPI Kap. **Dan Kennefick, '79** is an engineer at Louisville and **Bob Yule, '80** is an engineer at Belle.

Thomas Cloft works for Sundstrand Fluid Handling in Arvada, Co. In May, he received his MSME from RPI. He and Penny reside in Denver.

Asta Dabrila serves as a pipe support designer at Stone & Webster, Boston.

Chuck Johnson has just graduated from Cornell University Graduate School of Business, where he received his MBA. Currently, he is employed as a product specialist at Texas Instruments in Attleboro, Mass.

Henry LeBlanc is currently on leave of absence from his job with Mobil Chemical, and is now working in the promotions-PR department of the Summer Repertory Theatre in Santa Rosa, Calif., about an hour from San Francisco. As a promotions assistant, he's been doing a lot of fund raising, group sales promotions, and TV interviews. Active in theater at WPI, since graduation he has acted in numerous community theaters and dinner theaters on both coasts. "Fortunately for me, Mobil was kind enough to release me from my responsibilities for the summer so I could try something new here at SRT." He says that the company of 31 actors, aged 17 to 24, will each perform in three of six shows this season for over 50,000 people. Shows include "West Side Story," "The Crucible," and "Chicago." He writes that Santa Rosa is in the heart of the wine tasting country, and that he's become a familiar face on the wine-tasting circuit.

James Lunney is a field engineer for GE Ordnance Systems, assigned to Holy Loch in Scotland.

Scott Shurr holds a new post as systems analyst with the business systems group of Atex, Inc., Bedford, Mass.

Scott Sieburth works as a research assistant at Stanford. He holds an MA from Harvard.

1978

►*Married:* **Rodney C. Dill** and Sally Ann Stredny in Nashua, New Hampshire on June 6, 1981. The groom serves as a field engineer for GE Ordnance Systems and is currently located at Portsmouth Naval Shipyard. . . . . **Karen E. Hayes** and Willie F. Althammer in Fairhaven, Massachusetts on July 18, 1981. Mrs. Althammer is an engineering systems analyst. The bridegroom, an aerospace engineer, graduated from the University of Maryland. . . . . **Harold L. Jacobs** to Susan Stratton-Crooke in Scarsdale, New York on July 12, 1981. The bride, a graduate of Katharine Gibbs School, is a legal secretary. Her husband is with the family business, A. Jacobs Industries, in Westchester and New York City. . . . . **Douglas R. Parsons** to Karen E. Lucey on May 9, 1981 in Enfield, Connecticut. The bride graduated from Thompson School of Nursing, Brattleboro, Vt., and is employed by Choate Memorial Hospital, Woburn, Mass. The bridegroom serves as a programmer-analyst for the EDP Corporation, Needham, Mass.

Robert Brown is employed as a project engineer at Harris Corp. in Dover, N.H.

Ralph Chapman is a programming consultant at Baha'i World Centre, Haifa, Israel.

Currently, **Andy Corman** works for Turner Construction in Columbus, Ohio.

George Fredette holds the post of district engineer for Halliburton in Cortland, Ohio.

Frank Leahy, who has his master's degree in operations research from the University of California, Berkeley, is now designing a new planning system to coordinate production, inventory and marketing at Intel Corp., where he is a senior planner.

Paul Lefebvre is a mechanical engineer at the Naval Underwater Systems Center in Newport, R.I.

Dimitrios Promponas holds the post of senior computer analyst at Prime Computer, Inc., Natick, Mass.

Stephen Robichaud is manager of printer production at Data Printer Corp., Malden, Mass. The Robichauds live in Gardner.

Barry Rogers is with the Austin Company in Cleveland, Ohio.

Reginald Roome II is a structural engineer at LeMessurier Assoc., Cambridge, Mass. This year he received his MS from WPI.

Currently, **Margaret Staruk** holds the position of senior systems analyst at State Mutual in Worcester. She and her husband, Harry, have two children and reside in Holden.

Brian Timura has completed his second year at Tufts Medical School in Boston, and has begun his rotations as a clerk at Boston area hospitals. Among the various clerkships are: surgery, New England Medical Hospital; psychiatry, Veterans' Administration Hospital; and medical, Newton-Wellesley Hospital.

1979

►*Married:* **Keith C. Bonn** and Emily N. Strohm in Chappaqua, New York on May 30, 1981. The bride graduated from State University at Delhi. . . . . **Jeffrey Bouyea** and Debra G. Calaf on May 23, 1981 in Springfield, Massachusetts. The groom serves as a project manager for Wackworth Properties in Houston, Texas. . . . . **Arthur A. Foutsitzis** and Stavroula Pappas on March 8, 1981 in Worcester. The bride graduated from Worcester State College and was a foreign language teacher in the North Middlesex community schools, Townsend, Mass. Her husband, who holds a master's degree from WPI, is employed as a development engineer by Universal Oil Products, Process Division, Chicago, Ill. . . . . **Robert E. Guigli** and Charlene M. Tagliamonte on June 7, 1981 in Wellesley Hills, Massachusetts. Mrs. Guigli graduated from Boston College. The groom is employed by Ernest Guigli and Sons, excavating contractors, in Wellesley.

►*Married:* **David E. Largesse** and **Judy Bagdis**, '77, in Grafton, Massachusetts on April 11, 1981. The bride is an electrical engineer at Polaroid in Cambridge, Mass. The bridegroom holds the post of New England district manager of Balston, Inc., Lexington. . . . . **Peter Simonson** to Lynne S. Barriere on June 6, 1981 in Sterling, Massachusetts. Mrs. Simonson, formerly a pasteup artist for Achorn Graphics, Worcester, graduated from Anna Maria College. Her husband is an electrical engineer for Sanders Associates, Nashua, N.H. . . . . **Edward C. Tidman III** to Cheryl Ann Bagdonovich on August 8, 1981 in Worcester. The bride graduated from Assumption College and is personnel coordinator at Medical Personnel Pool. The groom, a group-insurance underwriter at State Mutual and editor of the Worcester Airport Newsletter, is studying for his MBA at Babson College, Wellesley. . . . . **Hans Van De Berg** to Carrie L. Davis on August 8, 1981 in Newington, Connecticut. Mrs. Van De Berg graduated from Briarwood College. Her husband is employed by Combustion Engineering, Power Systems, Windsor. . . . . **Robert Wroblewski** and Karen Ann Adamski in Ludlow, Massachusetts on June 20, 1981. Mrs. Wroblewski graduated from Notre Dame High School and works as a receptionist for the Credit Bureau of Western Massachusetts. The groom is employed as an electrical engineer for Honeywell, Inc., Lexington

Diane Curren Bird, who visited the mechanical engineering department at WPI on June 30th, reports that she is still with Westinghouse in the manufacturing engineering division working on reactor cooling pumps. She is the lead engineer for controlled linkage seals. She and her husband, an Episcopal minister, are both planning additional graduate study at Duquesne University starting this fall.

Richard Bonci works as a process engineer at Burlington Industries in Clarksville, Virginia. He and Karen have two children.

Gail D'Amico has been accepted at Tufts University in the School of Veterinary Medicine, where she will pursue a degree in large animal medicine and research. Currently, she is a doctoral student in pharmacology at Mount Sinai School of Medicine in New York City.

Thomas Dinan is a research assistant at the University of Illinois in Urbana.

Dan Grossman is now a software engineer in the network products group at Codex Corp., Manfield, Mass. He lives in Attleboro.

Steve Kapurch has begun his fourth assignment in the third and final year of the Navy Logistics Engineering Program. The last year will be spent at the Fleet Weapons Engineering Directorate, Pacific Missile Test Center at Point Mugu (Calif.) Naval Air Station. "Point Mugu may be best known as the Naval Air Station which President Reagan flies to for his western vacations in Santa Barbara." Earlier this year, Steve was stationed at the Naval Technical Representative Office at Inter State Electronics Corporation in Anaheim, with assignments including a review of engineering changes on the FBM submarine (Polaris, Poseidon, Trident) subsystems. Previously, he was assigned to the Naval Plant Representative Office in Burbank at the Lockheed Aircraft Corporation and at the Fleet Analysis Center in Corona, where he began his engineering intern program.

David Mangini works as a staff assistant at Southern New England Telephone in New Haven, Conn.

Michael McDonald is employed as a nuclear engineer II at Combustion Engineering. He resides in Palmer, Mass.

Jeff Michaels is now a process engineer at Borden Chemicals in Leominster, Mass.

Having received his MBA from Babson College last year, **David Smith** continues as a manufacturing operations analyst at GenRad, Inc., Bolton, Mass.

Marine second lieutenant **Gregory Van Houten** has reported for duty with the 2nd Amphibian Tractor Battalion, Marine Corps Base, Camp Lejeune, N.C. He joined the Marine Corps in 1978.

1980

►*Married:* **Timothy A. Andrews** to Valerie J. Cummings in Dighton, Massachusetts on June 21, 1981. The bride is a clinical psychologist with McLean Hospital and Mystic Valley Mental Health Center. She graduated from Dartmouth and Indiana University of Pennsylvania. Currently, she is doing advanced doctoral work at Harvard. The groom, who also graduated from Dartmouth, has an MS from WPI. He is doing graduate work at Sloan School of Management at MIT. He is employed by Honeywell Information Systems, Billerica, where he holds the post of senior programmer. . . . . **Robert F. Berlo** and Eve L. Martin on June 6, 1981 in Weymouth, Massachusetts. Mrs. Berlo graduated from Salve Regina College and is an RN at Quincy City Hospital. Her husband works as a sales engineer at Hinds & Coon Company of Boston.

►*Married:* **Timothy M. D'Arcy** and Patricia Ann Leemann in Somers, Connecticut on June 6, 1981. Mrs. D'Arcy graduated from the University of Connecticut School of Nursing and is employed by Hartford Visiting Nurse, Hartford. The groom holds the post of territory manager for Parker Hannifin Corp., Cleveland, Ohio. . . . . **Peter J. Folta** and Kathleen M. Kennedy on June 26, 1981 in Massachusetts. Mrs. Folta attended Holyoke Community College and is a manager for Burger King in Springfield. The groom is a rate engineer at Commonwealth Energy. . . . . **Anthony E. Jannetta** and Catherine A. Jeffords on June 6, 1981 in New London, Connecticut. The bride graduated from the University of Connecticut School of Pharmacy in Storrs. Her husband is with Harris RF Communications in Rochester, N.Y. . . . . **Robert J. Pearson** to Jamie E. Giguere on May 16, 1981 in Worcester. The bride is a student at Assumption College. The bridegroom is a chemical engineer for Pfizer, Inc., Groton, Conn. . . . . **Mark S. Tino** to Pamela Higgins in South Easton, Massachusetts. Mrs. Tino attended Aquinas Junior College. The bridegroom is a systems consultant for Arthur Andersen & Company.

Michael Aghajanian is associated with manufacturing management at GE in Chicago.

Theresa Metcalf Catanach continues as a financial analyst at Norton Co.

Raymond Cronin serves as a sales engineer and technical accounts representative at Megatest in Whitehall, Pa. He is opening a new district office for the firm in Pennsylvania.

Thomas Egan is employed as an engineering staff member at Rocketdyne Division of Rockwell International in Canoga Park, Calif. Also, he is president of High End Boardsailing, Sailboard Sales & Lessons.

David Gura works as a field logging engineer for Schlumberger of Corpus Christi, Texas.

Daniel Itse is an associate engineer at Riley Stoker in Worcester.

Pat Keough serves as a staff biochemical engineer at Merck Chemical, Danville, Pa.

Gareth Kucinkas is employed as an applications engineer at the Lee Co., Westbrook, Conn.

John Letourneau, who has received his MS degree from USC, is now a member of the technical staff at Bell Labs in Piscataway, N.J.

Donald May holds the post of field engineer for Raymond International Builders of New Jersey.

Fred Mirabelle continues as a design engineer for Harris Corp., Dover, N.H. "Recent business move from Harris/Westerly, R.I. to Harris/Dover. Division split."

Marguerite O'Keefe serves as an industrial territorial sales engineer for Westinghouse Electric Corp., Hillside, N.J. She is located in Roslindale, Mass.

Mark Pankoski is a programmer-analyst for the American Society of Civil Engineers in New York City.

Touradj Pourrahimi is with Macrodata Corp., Woodland Hills, Calif.

Angelo Scangas works as a maintenance supervisor for National Starch & Chemical in Plainfield, N.J.

Philip Suomu is a telecommunications section chief at AVCO, Wilmington, Mass.

William Taber works as a process engineer at Fairchild in South Portland, Me. He and Margaret reside in Yarmouth.

John Tasse is employed as a reactor performance engineer at Knolls Atomic Power Labs in Schenectady.

John Zahara works as a system engineer at Bunker Ramo, Trumbull, Conn.

1981

►*Married:* **Ruth Adams** to Manuel Teixeira in Norton, Massachusetts on June 20, 1981. The bride is a structural engineer for Stone & Webster, Boston. Her husband graduated from Norton High School and is employed in the shipping department of the Foxboro Company. . . . . **Scott T. Cloyd** and Rose Mary Jackson on August 22, 1981. The bride, a graduate of Southern Illinois University, is a high school business education teacher. The groom is an associate engineer with the Water Reactor Division of Westinghouse Electric Corporation, Pittsburgh, Pa. . . . . **Steven Dupont** and Andrea Nelson in Mattapoisett, Massachusetts on July 5, 1981. Mrs. Dupont graduated from Becker and attended Southeastern Massachusetts University. She is a physical therapist assistant.

►*Married:* **David E. Green** and Roberta M. Lepak in Massachusetts on June 27, 1981. The bride, a graduate of Mount Holyoke College, is a graduate student in psychology at the University of Massachusetts, Amherst. The groom is with S. R. Green and Sons, Holyoke. . . . . **Leon J. Laviolette** and Pamela Lynch on June 12, 1981 in Thorndike, Massachusetts. Mrs. Laviolette graduated from Palmer High School. Her husband is a contact engineer with Exxon Corp. in Baytown, Texas. . . . . **Bruce W. MacLeod** and Lynne Goldworthy on July 11, 1981 in South Portland, Maine. The bride graduated from Portland High School. The bridegroom is a civil engineer for Los Angeles (Calif.) County. . . . . **Francis G. Polito** to Paula L. Bisson in Worcester on June 20, 1981. Mrs. Polito graduated from Assumption College, and through New York University, spent her junior year at the Sorbonne in Paris. The bridegroom is a teaching assistant enrolled in the MS/PhD program at Cornell University.

Raymond Aubert has joined the Torrington (Conn.) Company, where he is a bearing engineer.

Currently, **Daniel Beliveau** is a second lieutenant in the U.S. Army Infantry. From March through May, he attended the Ranger course given at Ft. Benning, Ga. In May, he was stationed at Ft. Stewart, also in Georgia.

David Briggs is with International Data Sciences, Lincoln, R.I. . . . . **Richard Buckley** works for Harris Corporation-RF Comm. Division in Rochester, N.Y.

Radian Corporation, Durham, N.C. has employed **Suzanne Call** as a chemical engineer.

Currently, **Paul Chetham** is studying for his MD at the University of Massachusetts Medical School, Worcester.

Thomas Clark has begun work for Bell Telephone Laboratories, Naperville, Ill.

Katherine Coghlan serves as a second lieutenant in the U.S. Air Force.

Bonnie Cook is with the Air Force at the Pentagon in Washington, D.C.

Thomas Cotton has been serving as a teaching assistant in the WPI electrical engineering department.

Eleanor Cromwick has been employed by Turner Construction, Boston.

Scott Crossman holds the post of applications engineer at Fafnir Bearing, New Britain, Conn.

Robert Daley, Jr. works for Brown & Sharpe Mfg. Co., North Kingstown, R.I.

Richard Darcy works for Eastman Kodak Co. He is located in Pittsford, N.Y.

Daretia Davis, who currently resides in Houston, Texas, works for Exxon Production & Research.

Laurence Dean is an associate engineer for Westinghouse Power Generation Group in Lester, Pa.

Norman Delisle was recently named as a software research engineer at Tektronix, Inc., Beaverton, Oregon. He holds an MSCS from WPI.

Michael DiCostanzo is a graduate student at WPI.

Currently located in Dallas, Texas, **John Eagan, Jr.** has been employed by Texas Instruments, Inc.

Beverly Elloian works as a civil engineer at Bechtel Northern Corporation., Gaithersburg, Md.

Robert Endres has been hired as an electrical engineer by du Pont in Ingleside, Texas.

Lisa Fearn is employed by Varian/Extrion Division, Gloucester, Mass.

At the present time, **Patricia Ficociello** serves as a process engineer at Corning Medical & Scientific. She is headquartered in East Walpole, Mass.

The U.S. Department of Defense, Washington, D.C. employs **Paul Filosa** as a mathematician.

Mark FitzMaurice has been named an electrical design engineer at Texas Instruments in Dallas, Texas.

Walter Flanagan III is a structural engineer at Camp Dresser & McKee, Boston.

William Fletcher is now with Hewlett-Packard. He is located in Lexington, Mass.

Digital Equipment Corp., Maynard, Mass., has employed **Catherine Girouard** as a quality control engineer.

Mary Goodrow works for GE in Schenectady, N.Y.

Anestis Halkidis has joined Digital Equipment Corp., Maynard, Mass.

A. Kent Harnois is currently a maintainability engineer at DEC in Marlboro, Mass.

John Harris holds the post of development engineer at American Hoechst Corp., Leominster, Mass.

Robert Hawkins, who is located in Shreveport, La., works for Schlumberger Well Services.

John Healy works for Anaconda Metal Hose, Waterbury, Conn.

Dick Hennessy is currently employed by Brown & Sharpe Mfg. Co. in North Kingstown, R.I. He is in the management training program in the Manufacturing Engineering Department.

Lee Hevey, a mechanical engineer for Corning Glass Works, resides in Painted Post, N.Y.

Peter Hicks has been named as manufacturing engineer for the Connector Systems Division of Texas Instruments in Mansfield, Mass.

Leonard Hinds is a product quality engineer at Eastman Kodak.

Susan Hoffma works for Badger America, Inc., in Cambridge, Mass.

Joseph Horvath is now with Hughes Aircraft Company's Ground System Group, located in Fullerton, Calif. A member of the technical staff, he has a programming assignment with the System Development program. The 11,000-man Hughes Fullerton facility specializes in defense programs for the U.S. military.

Litton Data Systems has named **Dennis Houle** as a design engineer in Van Nuys, Calif.

David Ireland is a member of the technical staff at Bell Labs in North Andover, Mass.

David Jacobs has been with the department of physics at WPI, serving as a research assistant.

Deborah Johnson is a graduate teaching assistant at the University of Michigan, Ann Arbor.

Donna Johnston is a design engineer for du Pont, Wilmington, Delaware.

Roger Keilig has been accepted at Carnegie-Mellon University in Pittsburgh, where he will pursue his MS in geo-technical engineering.

William Kiczuk has joined the Equipment Group at Texas Instruments in Dallas.

Honeywell Information Systems has named **Deborah Kinne** as a member of the Advanced Engineering Program in Billerica, Mass.

Brian Klinka works for Westinghouse in Philadelphia.

Robert Kuklinski is a student actuary for Sunlife of Canada, Wellesley Hills, Mass. His wife, **Anne Haselton Kuklinski, '80**, works for Chas. T. Main, Boston.

David LaPotin, who has received his MSEE from WPI, is a design engineer with GTE Laboratories, Waltham, Mass. He graduated with a BSEE from Temple University, Philadelphia.

Glenn Lawton serves as an associate development engineer at Honeywell-Electro Optics Operations, Lexington, Mass.

Stephen Leslie has joined Travelers Insurance, Hartford.

Mark Malenbaum is a second lieutenant in the U.S. Air Force.

Jim McCall is employed as a professional research engineer by Chevron in California.

Richard Molongoski serves as environmental engineer in Boston at Camp Dresser & McKee, Inc.

Bernard Mongilio has been named systems analyst at State Mutual, Worcester.

Peter Nemiroff holds the position of director of research and development at The Nemiroff Corporation, New York City. He belongs to the New York Academy of Sciences, the American Association for the Advancement of Science, and the Sons of the American Revolution.

Scott Nisula has accepted a post as professional research engineer at Chevron Research Co., Richmond, Calif.

Douglas Norton is with the International Systems Corp. at GTE in Waltham, Mass., where he is an associate systems applications engineer.

Jay Norwood has joined Chevron. He is located in California.

Dave Patrick, who works for Texas Instruments, resides in Dallas.

Raymond Perigard has been named as a chemical engineer at Union Carbide Corp., Tarrytown (N Y.) Technical Center.

Automation Inc., Burlington, Mass., has employed **Gregory Phipps** as an applications engineer

Marylou Place is with Exxon Research and Engineering Co., Florham Park, N.J.

Michael Pugh works as an associate engineer for NBI in Boulder, Colorado.

Roland Roberge is a field engineer at GE.

Kurt Ross continues at WPI, where he is going to graduate school.

Fred Rucker has accepted the post of operations supervisor at AT&T Long Lines in Manchester, N H

Richard Rykosky has joined Gatx Terminals as a project engineer. The firm is located in Chicago

Jeffrey Smith is associated with operations engineering at Dresser Atlas Industries, Houston, Texas.

Greg Stanford is attending Carnegie-Mellon University, Pittsburgh.

James Steele continues at WPI, where he is studying for his master's degree in mechanical engineering.

Brian Stoffers works for Honeywell/ Small Systems and Terminal Division, Billerica, Mass.

Combustion Engineering has employed **Peter Tiziani** as an engineer I. The company is located in Windsor, Conn.

Jeff Trask is a professional research engineer at Chevron Research Co. (Standard Oil) in Richmond, Calif. He lives in Rodeo.

Jeffrey Wade serves as a product manager at Adage, Inc., Billerica, Mass.

Andre Walker has been named a development engineer at UOP, Des Plaines, Ill.

Mati Weiderpass serves as a second lieutenant in the U.S. Army.

Thomas Woodbury has joined Fluor Engineers & Constructors, Irvine, Calif.

Dennis Wysocki is now a project engineer at Clairol in Stamford, Conn.

School of Industrial Management

Frank Ashe, '68, recently received the President's Award as sales specialist of the year for American Optical's safety products business. He serves as manager of special accounts, and came to AO in 1945. In 1946, he joined the Safety Products Division. He has held his current post since 1972. He is a member of the American Society of Safety Engineers, the American Industrial Hygiene Association, and the Veterans of Safety.

On July 1st, **Samuel Sotir, '72**, opened his own business, The Office Center, a company offering office space and business services in Auburn, Mass. The center provides such administrative services as secretarial help, mini-computer operations, telephone answering, mail service, and Telex transmission. It also rents office space, including reception and conference rooms, with furniture and equipment being available. The company caters to consultants, regional sales persons, researchers, and job hunters who need part-time office space and help, and to businesses which need additional office space to accommodate peak work loads. Sotir is also founder and president of The Phoenix Corp. of Auburn, a financial management consulting company. He lectures on financial management at Assumption College.

Natural Science Program

►*Born:* to Edwina and **Michael E. Lewandowski, '74** a son, Brian Michael, on July 12, 1981. The Lewandowskis, who live in Somerset, Mass., have another son, Scott, 3.

Charles Ferris, '74 has been appointed the new headmaster and manager of the high and middle schools in Shrewsbury, Mass. He will be responsible for overseeing the transition from the current junior high and high school system to one comprising middle and high schools. Formerly guidance department chairman at Shrewsbury Senior High School, he helped coordinate the self-help for achieving personal excellence and the sex education life in the family programs at the high school. Also, he served as chairman of the staff development and drug abuse committees and wrote the "Counselor's Appointment and Activity Guide." He received degrees from Clark University and has attended Worcester State College. He is enrolled in an educational leadership and administration program at Worcester State.

Richard Stevens, '81, continues as a science teacher at East Jr. High School, Andover, Mass.

Ronald E. Greene, '17, died in Royal Oak, Michigan on April 26, 1981.

A native of Stow, Mass., he was born on March 1, 1893. He graduated as an electrical engineer from WPI in 1917. Following graduation, he served as an ensign in the U.S. Navy during World War I.

For seven years, he worked for GE in Schenectady, N.Y. In 1926, he joined the Detroit Edison Co., and remained with the firm until his retirement as assistant manager of construction in 1958.

Mr. Greene belonged to Tau Beta Pi, Theta Chi, the AIEE, and the Engineering Society of Detroit, as well as to the Economic Club of Detroit and the American Legion.

James Apostolou, '18, of Pittsburgh, Pennsylvania, a long-time employee of Westinghouse, died on February 19, 1981 at the age of 88.

He was born on Dec. 28, 1892 in Kavalla, Greece. In 1918 he received his BSEE from WPI. During his career, he was with Western Electric and Westinghouse Electric in East Pittsburgh, Pa., and Buffalo, N.Y. He had served as a general electrical engineer, application engineer, and sales engineer in various locations. In 1958, he retired from Westinghouse.

Howard L. Brooks, '19, a former chairman of the board of Ferro Enameling Co., Oakland, California, died on May 3, 1981.

He majored in chemistry at WPI, and later became a member of the Class of 1919. Early in his career, he was with Lewis Shepard Co., manufacturing engineers in Boston, Mass. In 1918 he served as a seaman second class in a special detail of chemical engineering (chemical warfare).

Mr. Brooks, who also studied at MIT, was a member of Phi Gamma Delta. He was born on Aug. 9, 1896 in West Springfield, Mass.

Joseph J. Morrow, '25, a retired vice president of Pitney-Bowes, Inc., died in Atlanta, Georgia on June 21, 1981. He was 78 years old.

During his 25 years with Pitney-Bowes, he served as director of personnel relations, was elected vice president for personnel relations in 1958, and then promoted to vice president for administration in 1963. As an administrator, he helped the firm extend fair employment opportunities to blacks, and as an Urban League board member, he made nationwide speeches on the subject of implementing a program to integrate blacks in industry. In 1968, he retired from Pitney-Bowes.

Civic-minded, he was officially associated with the National Conference of Christians and Jews, the Connecticut Equal Employment Opportunity Council, and the Business Equipment Manufacturers' Association. The late President Johnson appointed him to serve on the National Citizens' Committee for Community Relations. In 1958, he was named Citizen of the Year in Stamford, Conn.

Mr. Morrow was born on March 15, 1903 in Greenwich, Conn., and later became a student at WPI and MIT. At one time he operated his own building contracting firm. He belonged to ATO.

Arthur S. Chavoor, '28, died in Cambridge, Massachusetts on May 27, 1981 following a long illness.

A native of Syria, he was born on Aug. 16, 1904. He enrolled as a civil engineering student at WPI. For 41 years he was with the Metropolitan District Commission in Boston, which he served as associate civil engineer and assistant director of engineering in the Sewerage Division. He helped design the Deer Island pumping station, and retired as chief engineer of the division.

Mr. Chavoor was a professional civil engineer and land surveyor in Massachusetts. He was active with the Society of Massachusetts State Engineers, the Professional Engineers Association, and the Boston Society of Civil Engineers, as well as the Engineering Societies of New England.

Arthur W. Olcott, '28, retired vice president of the Property Owners' Service Corp., died in Damariscotta, Maine on July 12, 1981. He was 76 years old.

After studying civil engineering at WPI, he joined the New England Power Co. for two years. From 1930 to 1965 he was employed by the Highway Department of the State of Connecticut, where for three years before his retirement, he served as director of the Bureau of Rights of Way.

During his retirement, he was a consultant for real estate appraisal in Connecticut and became vice president of the Property Owners Service Corp. of Farmington, retiring again in 1976. He was chairman of the board of trustees of the Central Baptist Church, Hartford, Conn., and a member of SAE. He enjoyed making stained glass lamps as a hobby.

A Hartford native, he was born on June 4, 1905. At one time, he was consultant for the beautification program for highways inspired by Lady Bird Johnson.

Dr. **James H. Williams, '29**, a developer of sulfa drugs, died at his home in Ridgewood, New Jersey on June 11, 1981 following a long illness.

He was born on Jan. 1, 1908 in Manchester, England, and came to the U.S. in 1921. In 1929, he graduated from WPI with his BS in chemistry, and in 1933, he received his PhD in organic chemistry from New York University. He was a member of Tau Beta Pi, Sigma Xi, and Lambda Chi Alpha.

Early in his career, he was employed by the Patent Division of Allied Chemical Corp. In 1937, he joined the American Cyanamid Co. research laboratories in Stamford, Conn. In 1945, he was transferred to the Lederle Laboratories Division of American Cyanamid in Pearl River, N.Y., where he was administrative director of research. In 1948, he was named director of research of Lederle Laboratories, including the pharmaceutical and medicinal research. He retired in 1973.

Dr. Williams participated in and contributed to the development of sulfa drugs, folic acid, and Aureomycin, among many other life-saving products. He is credited with having named the drug, Aureomycin.

In 1945, he was chosen as one of 200 top U.S. scientists by the Joint Chiefs of Staff to study conditions in the chemical and pharmaceutical industries in Europe immediately following World War II. For this service, he was awarded a Certificate of Appreciation by the U.S. Army in recognition of his accomplishments as a technical observer.

In 1958, Dr. Williams was awarded a Certificate of Appreciation for his assistance with the American program for the Brussels Universal and International Exhibition held that year in Belgium. The award, presented by the U.S. Commissioner General of the Exhibit, particularly cited him for his arrangement, organization, and direction of the displays and background material featuring achievements on behalf of the U.S. pharmaceutical industry.

He was a life fellow in the New York Academy of Sciences, a fellow of the American Institute of Chemists, a fellow in the American Association for the Advancement of Sciences, and a 50-year member of the American Chemical Society.

Dr. **Herman W. Dorn, '33**, of Champaign, Illinois passed away on June 11, 1981.

He was born on Sept. 14, 1911 in New York City. After studying chemistry at WPI, he later received his AB, MA, and PhD from Clark University. He was a post-doctorate fellow in biochemical engineering at the State University of Iowa in 1943–44.

During his career, he was associated with International Minerals & Chemical Corp., Owens-Illinois Glass Co., Irwin, Neisler & Co., Picture Craft Co., and the U.S. Army Chemical Research & Development Labs. Also, he was employed by Lanpar Company and Parmae Labs, Mills Pharmaceuticals, Physicians' Medical Laboratory, Inc., and Glencoe Research. For a number of years, he was president of his own company, Dorn & Co., St. Louis, Mo. (food and drug consultants).

A registered, professional chemical engineer, Dr. Dorn was a fellow of the American Association for the Advancement of Science, the American Institute of Chemists, and the New York Academy of Sciences. He was also listed in a number of Who's Who publications. He had served as president of the Frozen Food Institute of New York City and belonged to numerous professional societies.

Edmund M. Fenner, '38, who officially retired from Johns-Manville in January, died in Denver, Colorado on April 4, 1981, following a long illness.

With the company since 1940, he retired as director of the Department of Environmental Control. In 1949, after four years' service with the Navy, where he rose to Lt. Commander, he was promoted to chief of JM's Research Mechanical Section. In 1962, he became project manager in the Plant Engineering Department, a post he held until his final appointment.

Mr. Fenner was a registered professional engineer in New Jersey. He was a member of Theta Chi, and was born on Jan. 4, 1916 in Orange, N.J. In 1938, he graduated as a mechanical engineer from WPI.

Robert H. Field, '38, president of Field Concrete Pipe Co., Inc. and a civic leader, died unexpectedly on July 26, 1981 at his home in Brooklyn, Connecticut. He was 66.

Born in Brooklyn on July 1, 1915, he became a member of the Class of 1938. During his lifetime, he was with Wickwire Spencer Steel, and the American Thermos Bottle Company, prior to founding Field Concrete Pipe Co., Inc., Wauregan, Conn., about 25 years ago. The company also has plants in Rhode Island and New Hampshire.

He was a former director and president of the American Concrete Pipe Association, and chairman of the American Society of Testing Metals. Previously, he was president and director of Day Kimball Hospital in Putnam, and chairman of its building and planning committees. He founded the Mortlake Fire Company. Active with the Boy Scouts, he also had served on the Brooklyn Board of Finance.

Mr. Field belonged to PSK. He had been a member of the President's Advisory Council at WPI and had been involved in several WPI fund raising programs.

Morey L. Hodgman, '50, died in Westwood, New Jersey on March 23, 1981.

His employers included Garden Turn, Long Island, N.Y.; Chance-Vought, Dallas, Texas; and Bendix Aviation Corp., Teterboro, N.J. He belonged to SPE. During World War II, he served as a pilot with the U.S. Army Air Force.

A native of Richmond Hill, N.Y., he was born on June 27, 1920. In 1950, he graduated as a mechanical engineer from WPI.

J. R. Normand Casaubon, '55, a retired electrical engineer for the New England Telephone Co., died July 2, 1981 at his home in Wellesley, Massachusetts at the age of 49.

He was born on Jan. 11, 1932 in Southbridge, Mass. In 1955 he received his BSEE from WPI. He had been employed by Bell Telephone Co. of New Jersey, AT&T, and New England Telephone. His posts included that of business research analyst and assistant engineering manager.

George E. Hammond, '64, passed away in Plymouth, Massachusetts on July 18, 1980.

In 1964, he graduated with his BS in physics from WPI. He received his MS degree from Northeastern University in 1967. He was born on April 13, 1942 in Worcester.

remember reunion june 4–6 1982

WPI winter sports schedule

BASKETBALL

Dec. 2	Wesleyan
Dec. 4(*)	City tournament
Dec. 4-5(*)	Nichols, Clark, Worcester State
Dec. 10(*)	Thomas
Dec. 12(*)	Bowdoin
Dec. 15	Amherst
Dec. 19(*)	St. Joseph's
Jan. 9	Springfield
Jan. 12	Babson
Jan. 15	Middlebury
Jan. 16	Norwich
Jan. 21(*)	Connecticut College
Jan. 23(*)	Bates
Jan. 28(*)	Brandeis
Jan. 30(*)	Lowell
Feb. 2	Trinity
Feb. 5(*)	Coast Guard
Feb. 6(*)	Colby
Feb. 10(*)	Williams
Feb. 13	Tufts
Feb. 18	MIT
Feg. 20(*)	Suffolk
Feb. 23(*)	Nichols
Feb. 27	Clark

WOMEN'S BASKETBALL

Dec. 1(*)	Framingham State
Dec. 4	City tournament
Dec. 5	Clark, Holy Cross, Worcester State
Dec. 7	Merrimack
Dec. 10(*)	Connecticut College
Dec. 12(*)	Emmanuel
Dec. 14	Western New England
Jan. 10	Fitchburg State
Jan. 21	Gordon
Jan. 23(*)	MIT
Jan. 25	Coast Guard
Jan. 27(*)	Anna Maria
Jan. 29	Trinity
Feb. 1(*)	Suffolk
Feb. 2(*)	Wheaton
Feb. 5	North Adams
Feb. 6	RPI
Feb. 10	Brandeis
Feb. 12(*)	Babson
Feb. 16	Amherst
Feb. 18(*)	Nichols
Feb 22(*)	Clark
Feb 25	Curry
Feb 27	MAIAW tournament

TRACK

Dec. 2	Tufts
Dec. 6	MIT
Feb. 10	Worcester State, Holy Cross

SWIMMING

Dec. 1	Babson
Dec. 4(*)	Holy Cross
Dec. 9(*)	Boston College
Dec. 11	Clark
Jan. 23	Lowell
Jan. 30	Coast Guard
Feb. 4(*)	Trinity
Feb. 6	Southeastern Massachusetts
Feb. 11	Brandeis
Feb. 13(*)	Tufts
Feb. 20(*)	Keene State

WRESTLING

Dec. 2(*)	Bowdoin
Dec. 8(*)	Boston College
Dec. 12(*)	Harvard, New Hampshire, Mass Maritime
Dec. 16	Brown
Jan. 16	Williams, RPI
Jan. 20	Amherst, Union
Jan. 25	Western New England
Jan. 30(*)	Lowell
Feb. 3	MIT
Feb. 6	Wesleyan, Hartford
Feb. 9(*)	Coast Guard
Feb. 16	Trinity
Feb. 18	NECCWA tournament
Feb. 25	NCAA Division III tournament

Alumni Basketball Night Saturday February 6

6:00

(*) indicates a home game. For more information on times and places, please contact the WPI Department of Physical Education and Athletics, (617) 793-5243.

Winter 1982

WPI journal

An Editorial

IN THE PAST DECADE, there have been only a few editorials of any kind in the pages of the *WPI Journal*. I wrote my first, by way of introduction, for the very first issue I produced, Spring 1971. This one will be my last, and its purpose is to say goodbye.

A magazine is a strange thing. It prints the work of many people—writers and photographers, faculty and staff, alumni and outsiders. It is shaped by the character of its audience and by the nature of the organization which publishes it. And yet, if a magazine is to be successful from any standpoint, it also reflects the character and personality of its editor.

As announced in the last issue of the *Journal*, I have left WPI after eleven years as director of publications. The new editor, Ken McDonnell, will introduce himself in due course. I am very conscious, as I write this, not only that am I saying goodbye to my readers . . . but that "my" magazine is also saying goodbye. *Journals* to come will surely be different than I could or would produce, because they will reflect the presence of a new editor. I wish him well.

THIS MAGAZINE in your hand is the 49th and last issue of the *WPI Journal* on which I have served as editor. That's a lot of pages, a lot of stories, and a lot of years. It has been a significant part of my career and of my personal and professional growth.

During that time, I have been helped by a great many people, and I would like to express my thanks to a few of them at this time:

to **Roger Perry, '45,** WPI director of public relations, who was an unfailing source of counsel and consolation over the years;

to **Steve Hebert, '66,** with whom I shared many a late-night and weekend conversation as we both worked strange and long hours;

to **Ann McCrea, Pat Korch,** and **Charlotte Wharton,** three capable and delightful assistants who helped make my work on the *Journal* possible by keeping up with so many other WPI publications;

to **Ruth Trask,** who has so carefully compiled the class notes—probably the most important job on the magazine, and certainly the hardest as well;

to **Ralph Kimball** and the late Bob Kerr of Davis Press, who have so capably printed the *Journal* for many years, often pulling the fat out of the fire at the last minute;

to **Jim Reidy** and **Kathy Swift** at CPC, who were so patient in helping me implement the typesetting of the *Journal* from word-processing equipment, and who never lost their cool, even when my instructions resulted in setting an entire article in 36-point boldface headline type;

to the members of the Alumni Publications Committee over the years, particularly **Bob Gosling, '68,** a member from the first meeting; **Larry Larson, '22,** an unfailing yet constructive critic; and **Don Ross, '54,** current chairman of the committee and a good man to work with;

and finally, very special thanks to **Walter B. Dennen, Jr., '51,** first chairman of the Alumni Publications Committee, critic and confidant, who demanded from me the very best magazine I could produce, and who for so many years was the perfect liaison between the *WPI Journal* and the WPI Alumni Association.

IT WAS Walter Dennen who pointed out recently that the time I came to WPI and to the *Journal* marked the confluence of a great many changes taking place at WPI and within the Alumni Association. The WPI Plan was being conceived, adopted, and implemented, marking a radical break with educational tradition. Women undergraduates had been admitted to WPI for just a couple of years. The Alumni Association was in the process of merger with the college administration. Many alumni were concerned over the future of the college and of the Association, and the *Journal*'s importance as a communications vehicle was recognized by all.

The new editor—me—was the first non-alumnus to hold that position—and I wasn't even an engineer, either. Those differences, together with the events of the times, helped put me in the glare of a spotlight that wasn't always favorable. The Alumni Publications Committee was formed in those turbulent days to provide a kind of sea anchor for the *Journal*, to help keep it on course. In the eleven years since, the college has prospered and gained a national recognition unparalleled in its history; the Alumni Association has also prospered, with increased activities and participation by alumni, and record-setting, award-winning alumni funds year after year. As for the *Journal* . . . you be the judge.

The WPI Journal has been a source both of frustration and of pride for me. It has called for more energy, more agony, and ultimately more creative inspiration than any other part of my career at WPI. I have cursed its unrelenting demands, issue by issue, and then sat back to take pride in the finished product and the awards it won from time to time (though there were some real clunkers in there too, in eleven years). It will be a kind of relief for me, knowing there won't be any more *Journals* to make . . . and yet in many ways I'll miss it. It has been too big a part of my life, too long, for things to be otherwise.

So goodbye, *Journal* readers. I wish you well too.

–Russell Kay

WPI journal

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Steve Rosenthal

A Homecoming for Atwater Kent Laboratories

By Russell Kay

THIS WAS THE YEAR, 1981, when "Homecoming" meant something extra special for the Electrical Engineering and Computer Science departments at WPI. The major event of the day was the official rededication of Atwater Kent Laboratories, which had been vacant for all of 1980–81 while being renovated.

Featured speaker at the rededication ceremonies on Homecoming Saturday, October 4, was Dr. Joseph Kerwin, a physician and NASA astronaut who took part in the Skylab missions. Dr. Kerwin, a philosophy graduate of cross-town neighbor Holy Cross, spoke of his delight in reading about WPI's educational program, seeing it as just the sort of program that this nation needed. Kerwin's remarks were delivered to an enthusiastic audience—so large, ironically, that the ceremonies had to be moved to Alden Memorial Auditorium. Not even the refurbished and renamed Hobart Newell Lecture Hall in Atwater Kent could accommodate the hundreds of people who turned out.

The new Atwater Kent

Atwater Kent has been changed dramatically, both inside and out. The architects who masterminded the transformation—Goody, Clancy & Associates, Inc., of Boston—radically changed the inside and also created a brand new addition to the building for faculty offices. The addition, situated on what used to be the "back end" of the building, facing Salisbury Laboratories, is a striking piece of work. It echoes the older two-story-high arched windows that lined the original trolley barn, but it makes them an even stronger design element (as they play against the modern, less embellished brickwork) than they were in the original structure. The sides of the addition, done in square panels of black glass, reflect dimly the ends of the older section of the building. Taken together, the new and the old, Atwater Kent Laboratory is (in the author's opinion) the handsomest building on the WPI campus except for Boynton Hall.

The old meets the new, above, as the Atwater Kent addition is spliced into the original's roof. On the facing page, the addition is wrapped up like a gigantic Christmas present, as work proceeded through the winter on the renovation.

The inside of the building is a far cry from the old Atwater Kent, which was, in recent years, characterized by awkward large spaces that could not always be used effectively . . . and by older, sometimes seedy small offices and labs that also were not as useful as they could have been. Remember that Atwater Kent was originally built to handle the engineering of such things as large electric generators and motors—and the famous trolley car, of course—which were extraordinarily large pieces of equipment to be housed and cared for.

While those motors and generators are still an important part of the world of electrical engineering, there has been a significant impact on the discipline made by the electronic computer revolution. Work in the areas of computer engineering and programming, control systems, instrumentation, and communications is centered around ever-smaller pieces of equipment, down to the fingernail-size integrated circuits and microprocessors that run everything from digital watches, stereo radios, and auto ignitions (shades of A. Atwater Kent's days!) to spacecraft control and satellite monitoring systems. The new Atwater Kent takes full advantage of these trends to offer a variety of medium-scale laboratories for the study of modern-day electrical engineering and computer science.

For EE, Homecoming 81 marked the return to a modernized, more effective version of the home they had occupied for 73 years. For Computer Science, Atwater Kent is the first real home they have ever had, from their start in makeshift quarters in the basement of Salisbury, then to makeshift quarters in Higgins Laboratories, then to the second floor of Washburn. This rapidly growing department finally has room for its people and room in which to develop effective laboratory work. (And the recent arrival of a Data General MV/8000 32-bit computer, a gift from the manufacturer, will add significantly to that laboratory capability, too.)

Atwater Kent was a priority goal of WPI's current Capital Program, which seeks to raise $16 million in new capital resources, chiefly to provide physical facilities commensurate with the quality of WPI's curriculum. Major contributors to the Atwater Kent project included the George I. Alden Trust, the Kresge Foundation, WPI trustees and others, the classes of 1929, 1930, 1941, 1954, and 1955, plus numerous friends in the corporate and industrial community.

Noting the exemplary generosity of corporate and business donors, campaign chairman Raymond J. Forkey, '40, said that members of his committee were enthusiastically received by most corporate executives, who expressed their universally high regard for WPI graduates employed by their companies. Most of them indicated that WPI's excellent reputation was a significant factor in their decisions to support the Atwater Kent renovation.

A historical perspective

Atwater Kent Laboratories is an important part of the WPI campus. Only Boynton, Washburn, and Salisbury are older.

Shortly after the turn of the century, *The Worcester Magazine* reported that "the trustees of Worcester Polytechnic Institute have recently taken a most important step in deciding upon the immediate erection of a new building to be used exclusively for electrical engineering purposes."

The decision came none too soon for the faculty of the young department, which had started as a branch of the Physics Department in 1897 and soon found itself caught between burgeoning enrollments and inadequate facilities. By 1905, the number of students majoring in electrical engineering equalled the total number in all other departments, and the faculty was subsequently forced to "limit" the number of departmental course offerings. In the same year, Professor Harold B. Smith wrote a dramatic report to Institute President Edmund Engler in which he suggested that "complete strangulation" of his young department was imminent.

"It is my hope," he wrote, "that the first decade of this department may be closed by the dedication of a suitable building and equipment for the work of this department."

Fortunately for him (and for WPI today), that hope was fulfilled. The Institute's 1907 Commencement exercises were held in the new (and nameless) building, which was constructed in the shape of a symbolic "E". Faculty, students, and visitors enthusiastically proclaimed the new facility "the largest and best in the world."

It was built at a cost of $125,000.

The new electrical engineering laboratory was a genuine showplace of its era. It housed the most modern equipment of the day—a traveling crane; balconies of dynamos and motors; and, best of all, a 40 foot trolley car named "1907". This car was fully equipped to test speed, voltage, current, and resistance automatically, along with a variety of other tasks. The "Tech Trolley" eventually tested nearly 4,000 miles of New England's extensive network of electric railways before it was scrapped in 1937. Until then, probably no piece of laboratory equipment had ever been so valuable—or so much fun—for students and faculty alike.

Carefully planned and handsomely equipped, the new laboratories fulfilled the fondest hopes of Professor Smith and his colleagues. Designed for the large space requirements of that era's electrical and power technologies, it served the college's needs adequately for 50 years. In 1958, work began on extensive renovations which provided more than 7,000 square feet of additional space for laboratories in the emerging fields of electronics, computers, servomechanisms, microwaves, and high frequency circuits.

When the building was reopened in 1959, two new floors had been added in the open space above the old electrical machinery laboratory; there was laboratory space that would eventually house WPI's first educational computer; faculty offices had been altered and redecorated, classrooms modernized, all new heating, lighting and ventilation installed; and there was a new entrance on the south side of the building, facing the main campus. Honored guest at the ceremonies of the day was A. Atwater Kent Jr., son of the benefactor whose generosity had made possible those sweeping improvements.

But the changes made then have been completely overshadowed by the latest renovation of the building. The total cost of the remodeling of Atwater Kent last year was $3.2 million.

It seems appropriate to consider this outlay a prudent investment in the future, much as did the Institute's trustees who authorized construction of the original building in 1907. Their foresight, conviction, and courage has been more than amply rewarded, for WPI graduates have been on the cutting edge of developments which have led to contemporary "high technology."

If we agree with Shakespeare that "What's past is prologue," then the reopening of Atwater Kent Laboratories may well mark the start of another era of technological progress whose accomplishments will beggar the imagination.

Steve Rosenthal

An architect's perspective on Atwater Kent

The original 1907 "Electrical Laboratory," with its handsome facade, large arched windows, and expansive interior, presented Goody, Clancy & Associates with a sound basis with which to satisfy the needs of WPI's Computer Science and Electrical Engineering departments—as well as a challenge.

Over the years, the need for the high open space used in the great laboratory for work and practical instruction on such equipment as electric street railway cars and turbines diminished. So gradually, the space was partially divided with floors and walls to create room for newer, specialty areas such as electronics and computers. When WPI made the decision to house both Computer Science and Electrical Engineering in this fine old building, it was obvious that it would have to be made more efficient and that a new addition of several thousand square feet was needed.

A major design goal from the beginning was to preserve the character and quality of the original Peabody and Stearns building. The north facade of Atwater Kent Laboratories, facing Salisbury Street, marks a major entrance to the WPI campus. In addition, it is laden with WPI tradition: in the college's early years the front entrance and stairs were an important meeting place for students—important enough to be held off-limits to freshmen—and for decades class pictures were taken there.

Working closely with the WPI administration and faculty, and after numerous studies, Goody, Clancy & Associates developed a design that placed the new addition on the south side of the building, creating a new entrance (across the building from the original) facing into the campus and accessible to the major flow of student traffic. The brick window arches along the length of the building were retained as interior corridor walls, and the rhythm of those two-story-high arches was echoed on the exterior, in more contemporary form, as part of a new masonry wall pulled out from the existing building and enclosing the addition.

Faculty offices were provided in the new space adjacent to the labs in the existing building, allowing closer supervision of student projects. The third floor was more efficiently used, with additional laboratory and office space placed beneath a new, raised roof. To facilitate future changes and maintenance, service ducts, pipes, conduits, and equipment were left exposed and accessible. The entire building was made energy-efficient, with careful attention being given to the new thermal windows, both in the addition and the old building, to ensure their aesthetic compatibility.

GC&A is proud of the resulting design of the new Atwater Kent Laboratories, which has preserved its architectural heritage while bringing it up-to-date, creating a pleasant and efficient environment for the continuation of WPI's high educational standards for many years to come.

–Goody, Clancy & Associates, Inc.
Boston, Massachusetts

Steve Rosenthal

Steve Rosenthal

Above, the student lounge, highlighted by the old power distribution panel, no longer used for its original purpose but still effectively tying the building to its past. Also contributing to the feeling of the old building are the second-floor arches, once window tops. On the facing page, two more aspects of Atwater Kent: faculty offices and laboratories.

At left, Henry Styskal, Jr., '50 waves the CASE-U.S. Steel award (that's three in a row) to an appreciative crowd at the Homecoming football game, while university relations vice president Tom Denney congratulates him for the award-winning Alumni Fund.

Below, part of the Homecoming festivities surrounding the game.

At top, Harold S. Black, '21, inventor of the negative feedback concept and honorary chairman of the rededication festivities, unveils the plaque with Raymond J. Forkey, '40, chairman of the Capital Program which raised funds for the renovation. At right top, Dr. Black is shown along with retired EE Professor Hobart Newell, who was responsible for introducing electronics into WPI's EE curriculum and after whom the Atwater Kent lecture hall is named, and Professor Donald Eteson. At left and above, NASA astronaut Dr. Joseph Kerwin addresses the audience of alumni and students.

The alumni attitudinal survey: A final report

By Stephen J. Hebert, '66

In the Summer 1981 issue of the *Journal*, a preliminary report summarized statistical results of the Alumni Attitudinal Survey directed by Paul Kennedy, '67, and Jack McCabe, '68. Since then, the written comments have been summarized and they have added depth and breadth to the statistical responses.

By definition and necessity, a significant portion of the communication for WPI's alumni program is through the mail. Thus, one of the early questions in the survey focused on an evaluation of the quality, quantity, and effectiveness of that mail. Approximately 800 people responded with written comments. Many thought the quantity was appropriate, although one person said it could be cut in half, and a few people even suggested it could be increased. In terms of quality, there were a few superior comments, while most rated the quality of the publications as good to excellent.

Several alumni felt there is too much fund-raising material, and these comments correlated well with the statistical results. Some people felt that 50 to 75 percent of all WPI mail asks for a gift. To the contrary, approximately 75 percent of all WPI mail to alumni is *non*-fund-raising in its purpose, including the *Journal* and *Newsbriefs*.

Some 100 people commented on the *Journal*. About half said it was excellent but the other half appealed for a broadening of the scope of the quarterly magazine. In general, the comments were positive and constructive such as: "[I] would appreciate more in-depth reporting on faculty activity and alumni actions," while on the other side of the coin was the comment that "communications show a lack of sensitivity." That last statement targets an area we must work on.

The survey was originally conceived to determine alumni attitudes and impressions with the hope that the alumni programs—and perhaps the operations of WPI—could be improved as a result. Thus, a question about how WPI could improve its alumni relations was logical. Two major ideas emerged. A surprising response—surprising at least to Alumni Association officers and staff people—was that regional programs and activities should be improved and expanded upon. In recent years, regional activities have tended to be somewhat informal, but it seems clear from the response that there is renewed interest in this area. Thus, we have already taken steps to foster and promote the regional club program. Only time will tell if the response will justify the renewed emphasis, but initial indications are very positive.

A greater concern than the regional alumni program was the desire of a large segment of our respondents that WPI should be more widely recognized by the general public. There was a strong expression of desire to expand and improve the WPI public relations program to place WPI's name in front of more people with greater frequency. This would, at least partially, answer the question heard so frequently outside New England: What's WPI?" It is clear from the survey that our alumni are very proud of their Alma Mater, they want WPI to be recognized, and they believe WPI as an institution should be known and respected by a broader spectrum of the general public. Thus, an effort is underway to enhance the public image of WPI and its alumni.

Along the lines of improving the image and profile of WPI, one person responded that there is "a need to build loyalty in the current student body in the hope that the investment will pay off in a few years." Similarly, "wider press coverage—i.e., national news and business magazines—is especially important in telling alumni (and non-alumni, too) about the uniqueness and excellence of the WPI Plan." Others: "Stimulate and report local/regional clubs—provide programs on current activities on the Hill and tie in with Alumni Admissions recruiting. [Make] a special effort to involve recent grads." One person said, "some years ago I complained that WPI

Jack McCabe, '68, and Paul Kennedy, '67, pore over survey questionnaires and computer printouts.

was generating high quality 'technicians,' not engineers. The Plan has gone [a long way] toward improving that situation, but I believe more can be done . . . Alumni are a powerful source of well-informed help. Exploit us!" Finally, someone said, "increase personal letters from the President to alumni." It was clear from the responses that alumni want to be involved, they want to know what's going on, and they want their Alma Mater to be appropriately recognized by everyone.

Another item that surfaced was the expressed desire to know more about individual alumni. Expanding class notes in the *Journal* and a new issue of the Alumni Directory were popular suggestions.

The larger question of the college itself and its perceived strengths and weaknesses evoked the largest response in the questionnaire. More than two-thirds of all respondents, or over 2,000 people, wrote an answer to this question.

Significantly, respondees cited WPI strengths much more frequently than weaknesses. Over half of the responses acknowledged WPI's reputation as a basic strength. Another 25 percent mentioned the quality of the education, the dedication of the faculty, the student-faculty ratio, the small size of the institution, and the WPI Plan as very real strengths. The perception of the Plan as a strength varied somewhat with age. That might normally be expected, since younger graduates have actually experienced the Plan, while people who graduated prior to the 1970s perceive it according to what they have heard and read about the Plan, or how they have had contact with it through working with Plan graduates, or by knowing someone who studied under the Plan.

Most people who responded to the strengths question listed at least two strengths. Some people actually omitted weaknesses. However, about one-sixth of the respondents mentioned the same point (the largest single weakness cited), saying that WPI does not receive enough recognition, that the school is not well enough known. This response seemed more prevalent the further people live from Worcester. Other items suggested as weaknesses were the high cost of a WPI education today, athletic support, the WPI Plan, the size and quality of the graduate program, the humanities program, the current grading system, and social life on the WPI campus.

Perhaps the most striking aspect of these answers was their surprising consistency: there was very little contradiction. 490 people thought the WPI Plan was a strength sufficient enough to be mentioned by name, while only 75 individuals mentioned the Plan as a

weakness. Still another 241 cited a good curriculum as a WPI strength. If nothing else, this may indicate the continuing need to describe the workings and philosophy of the WPI Plan to all alumni—and the general populace—so they might better evaluate its impact and effectiveness as the educational philosophy of their Alma Mater today.

Some comments from the strengths and weaknesses question included, as strengths: "The educational training, tradition, faculty, expertise and career counseling"; "WPI treats undergraduates with a great deal of respect and undergraduate placement is super"; and "the academic stimulation potential of the Plan." Under the weaknesses section, one comment offered was "the way the competency exam is handled." This has been recognized as a problem in some departments and has been addressed and hopefully resolved. Other mentioned weaknesses: "The advisor system—too many holes and cracks to fall through"; "a stronger graduate program is needed"; and "improved promotional efforts should be made." Many of the weaknesses described raise valid points, while others reflect situations which have long since been addressed and corrected.

This attitudinal survey is only a beginning. According to Paul Kennedy, '67, "it gives us much to consider and evaluate as we determine directions for the alumni program in the months and years ahead. I was extremely pleased by the total response to the program; the 3,000 responses far exceeded our best expectations. We might question the validity of these results, because they were so positive, but I have every reason to believe they accurately reflect the views, opinions, and attitudes of the WPI alumni body in 1981. We believe that every alumnus who wanted to had the chance to respond, to air his or her views. We appreciate the time everyone took to answer the survey. We hope our actions in response to your comments will be judged by everyone to be positive and significant, and we welcome your ongoing commentary, input, and advice."

In reflecting upon the survey, Alumni Association President Peter H. Horstmann, '55, indicated that several steps have been initiated to address areas of concern identified in the survey. Among these steps is the formation of two task forces. One is addressing the regional program and its impact throughout the country. That task force is chaired by Harry W. Tenney, Jr. '56, vice president of the WPI Alumni Association. He expects to present a final report and specific recommendations to the March 1982 meeting of the WPI Alumni Council.

The area of image and public relations is a much broader topic and is being addressed by a task force chaired by Philip B. Ryan, '65. It is expected this will take much longer to complete than will the regional task force assignment. However, their end results may be more extensive and have a greater impact for WPI over the longer term. Said Mr. Horstmann, "I'm enthused by the activity of these two groups, and I expect some very positive action from them. They have been meeting now for several months, and I look forward to reporting the results of their activity to all alumni."

To address the concern of alumni to know more about their fellow alumni, a new edition of the WPI Alumni Directory is currently being initiated. A questionnaire to verify biographical information on file was mailed to all alumni in early January, and the book will be available for distribution by June 1. The Directory will be available for sale to all alumni and can be ordered directly through the Alumni Office or through the questionnaire which was sent to each alumnus.

Horstmann, in conclusion, said that he and the entire Association Executive Committee was stimulated by the response of everyone and he encouraged their continued involvement, interest, and participation. We're all working to make WPI a better and stronger institution, and a strong and active alumni body is a key ingredient in that process."

You went to WPI to become a doctor?

By Ruth Trask

For over a century, WPI has graduated engineers who have helped keep the wheels of industry turning; plan cities, dams, and highways on an international scale; and contribute to advancements in science. For the last ten years, WPI has also been graduating students who entered the college already knowing that engineering was not their life goal, or who changed their minds along the way. Many of these graduates ultimately went on to professional schools, and many are now doctors, dentists, or veterinarians.

The following article tells the story of several of these graduates who marched to different drummers. It also tells how WPI helped shape their careers.

When David Hubbell, '73, first set foot "on the hill" as a freshman, going to medical school was not uppermost in his mind. "I was going to be an electrical engineer," he says. It was WPI's wide-ranging curriculum and the advent of the Plan, he believes, that eventually led him into medicine.

"I started out as an electrical engineering student under the old [pre-Plan] system," he reports. "At the end of the first year, I began to get interested in biomedical engineering, then a new department at WPI. At the beginning of my junior year, I made the decision to apply to medical school. By that time, I was a WPI Plan participant.

"It was when I participated in my major Plan project—sensory aids (electronic) for the blind—that I realized how much interest I had in medicine in general, an interest I had not recognized before. If I had been stuck in a traditional engineering curriculum, I would not have had the opportunity to make this discovery."

Hubbell says the Plan was helpful in other ways. The less structured course selection allowed him the freedom to quickly get the rest of his premed requirements out of the way so that he had plenty of time to apply to medical school. When WPI lacked premed courses that he needed, he took them at Clark and Holy Cross through the Worcester Consortium.

"Most importantly," he explains, "my participation in an engineering school and more specifically, the unique aspects of the Plan, afforded me a definite advantage in the medical school admissions game. I am firmly convinced that with the huge numbers of applications to medical school, one needs a 'gimmick'—a way to have one's application stand out from the crowd.

"Every place I interviewed, I was asked to explain my Plan project in detail. It was easy to tell that the interviewers were impressed with the Plan and with my involvement in it. Satisfactory performance at WPI under the Plan means the ability to operate independently and to work through a real problem in the real world. Medical schools, as well as other professional schools, look very favorably on this concept."

Once in medical school, Hubbell found the course work tedious but relatively easy. He feels it was easy for him because his scientific background at WPI "more than stood up to the test."

Dave Hubbell, '73

Hubbell gives credit to Dr. Robert Peura, '64, coordinator of WPI's biomedical engineering program, for facilitating his entrance into medical school. "He was my advisor and assisted me with my project, course selection, and medical school application process. I have since been associated with several other colleges and medical schools, and I can honestly say that I have not seen the kind of personal attention and dedication that WPI's faculty demonstrated."

In 1973, Hubbell graduated from WPI with the first class to include Plan participants. In 1977, he graduated from Boston University School of Medicine. From 1977 to 1981 he did an internship and residency in obstetrics and gynecology in San Diego, Calif. Currently, he is a staff obstetrician and gynecologist at the Naval Regional Medical Center in the Philippines.

Recapping the value of his WPI premed experience, Dave Hubbell says, "I feel that a college should teach a person how to approach problems and to work them through logically and creatively. The specifics of any particular course are lost with time unless they are continually reinforced. It is not the course material per se that is important, but this process of acquiring and applying new knowledge. I believe that WPI's program affords a unique environment in which this process can be mastered. Given this key to continued learning and creative thinking, I believe that a successful WPI student is prepared for the pursuit of any field. I believe that WPI's past and future performance will bear this out.

"In short, I would say that a WPI education serves as an excellent background to the field of medicine, and its unique educational program can act as a key to open the door."

Raymond Dunn, '78, like Dave Hubbell, believes that the flexibility of the WPI curriculum turned him in the direction of medical school.

"In retrospect," he says, "I feel that, had I attended an institution with a structured premed curriculum, I would not have chosen to go to medical school."

After discussing undergraduate education with several of his colleagues, he concludes that their more traditional curriculum (basic medical sciences) "did not allow them other educational experiences which, I believe, are more critical in the long run for the clinical years in medical school and subsequent residency training and practice."

Dunn, who is at Albany Medical College, believes that WPI's basic educational philosophy forced him to think on his own and mature as a student. "Independent thinking," he comments, "is paying off now and will continue to do so."

He says that his WPI advisor was very helpful with his application to medical school and in outlining his basic course requirements, although a few extra undergraduate courses might have helped him during his first year at med school. All in all, Raymond Dunn is very happy with the preparation he received at WPI.

So is Dr. Francis Kiernan, '75, a senior resident in internal medicine at Hartford Hospital, Hartford, Conn. He reports, "I feel that the rather concentrated seven-week courses under the WPI Plan are similar in structure to the courses at medical school, which consist of studying one particular area of medicine (i.e. biology or cardiology, etc.) in a concentrated fashion for a few weeks."

Also, his school, the University of Connecticut School of Medicine, required each student to complete a research project prior to graduation. "This project was in many respects similar to the major qualifying project (MQP) required at WPI."

Kiernan did his MQP at St. Vincent Hospital, Worcester, where he studied abnormalities in red blood cells caused by an enzyme deficiency and used WPI's scanning electron microscope (SEM) to observe the surface morphology of defective cells. He spent so much time with the SEM that his project advisor, the associate director of hematology at the hospital, once remarked, "Kiernan has become more proficient than I and most other faculty in its operation."

Following his current training in internal medicine in Hartford, Kiernan will begin a fellowship in cardiology.

Besides Hubbell, Dunn, and Kiernan, there are numerous other WPI graduates who have gone on to professional schools and careers. Dr. Daniel Funk, '77, for instance, is now a resident in orthopedic surgery at the Mayo Clinic, Rochester, Minn. "My interest in engineering continues, since this program has an outstanding biomechanics laboratory which specializes in joint replacement," he says. Funk received his MD from the University of Cincinnati in 1981. Recently he returned from Switzerland, where he studied under a surgeon who specializes in fracture fixation with implantable devices.

He says of his WPI premed background, "During my first two years of medical school, I was unprepared for letter grades, fourteen-week semesters, and final exams."

Believing that the study of medicine does not stop with the classroom, Funk continues, "It is in this regard that the Plan has greatly helped me to compete in the professional world. Daily I have to make decisions for which there are no answers, choosing among options that aren't listed in a textbook. I use communication skills constantly, both in presenting cases to colleagues and in consulting patients and families. It is not the knowledge of medicine which enables me to 'compete' in this sense, but rather the way I make decisions and how efficiently I use my time. And these are the skills that are intrinsic to the educational process of the Plan."

He says that, in some respects, the preprofessional program at WPI is not as adequately directed or financed as it is at some other schools. "This is understandable when examined by supply-side economics. It is impossible for WPI to provide the same backing for candidates as those colleges which rely on professional school placement for a large percentage of their graduates. WPI does not need this, because the majority of alumni establish immediate careers after graduation; the organization to help those graduates seems active, healthy, and politically powerful." Almost as an afterthought he adds, "there are times when I wish WPI had an Old Boy network like the Ivy League schools."

One of Dan Funk's classmates, Bruce Minsky, '77, feels somewhat differently about WPI's preprofessional setup. "WPI is not a premed factory like some colleges," he says. "I like the idea of its not having a premed committee to screen applicants. It's to the advantage of the goal-oriented individual not to be prescreened, not to be judged on an arbitrary grade scale."

Being goal-oriented himself, Minsky also approves of the more or less unstructured premed advising available at WPI. "It gives the motivated, self-starting student more options in the end."

Minsky, who has been attending the University of Massachusetts Medical School in Worcester, will soon begin his residency in radiation oncology at the Harvard Joint Center for Radiation Therapy, which coordinates cancer treatment for most Harvard teaching hospitals.

"Radiation therapy is a very technical field," he says. "And even though I was a life sciences major, I learned a lot of physical principles by 'osmosis' at WPI. My technical background has definitely helped me all along the line. For example, I was recently involved with the Massachusetts General Hospital cyclotron project in which cancer patients receive proton beam therapy." He also feels that WPI's compact, seven-week terms forced him to form good study habits that have carried over into medical school.

"One of the most rewarding facets of my undergraduate education was the project work," he declares. For one project, he performed a transmission electron

Bruce Minsky, '77

microscopy study of urinary bladder fusiform membrane vesicles and their dependence upon urine concentrating ability. A report of that work was published in the Journal of Cell Biology. In 1977, another article concerning summer research he did in the Department of Radiation Therapy at Harvard Medical School appeared in an issue of Radiation Research.

"Every medical school application I filled out inquired about projects and publications," Minsky reports. "At WPI I was privileged to have been involved with both. As a matter of fact, some of the work I did in medical school was based on my early WPI papers and projects."

Paul Johnson, '79, another WPI graduate at the University of Massachusetts Medical School (UMMS), says, "With so many applications, medical school admission committees tend to seek criteria with which to distinguish candidates. I feel that the project-oriented WPI curriculum plus the competency exam gave me an edge in the premed competition. Furthermore, the individualized plan of study stressed at WPI prepared me nicely for medical school studies. Much of the first two years of basic science as well as present and future clinical endeavors is self-learned. Medicine is a continually evolving specialty requiring constant learning and review. WPI provided me with the essence of this self-discipline and motivation, and I will be ever grateful."

While at WPI, Johnson's project work was involved with American literature, practice teaching in music, and diabetes research, the latter being carried out with a staff member at the biochemistry department at UMMS, and Dr. D. T. Browne (chemistry) and Dr. T. C. Crusberg (life sciences) on campus. "Dr. Crusberg also did a superb job as my premed advisor," he adds.

At the present time, Johnson is a third-year student at UMMS. Recently, he completed a summer clerkship in anesthesia at Massachusetts General Hospital. He extended his WPI project work on diabetes during his freshman summer (1980), and it has just been accepted for publication by *Metabolism*. Earlier, his MQP results were presented at the International Diabetes Federation Meetings in Vienna, Austria. "Obviously, the research experience offered at WPI has been invaluable in developing both my scientific interest and clinical attitude."

Mark Mahoney, MD, '74, believes that going to a small college was to his advantage because at WPI individual attention is given to students trying to get into med school. "Although I may have needed a bit more guidance in course selection from my specific department advisor, Dr. Crusberg was most helpful as my premed advisor. Also," he continues, "at WPI there isn't that high degree of cutthroat rivalry that exists in colleges with larger premed programs."

He feels that the freedom of the Plan allowed him to tailor a curriculum that prepared him for medicine. "At the same time, I learned enough biochemistry so that I could have gone on to graduate work, had I not gotten into medical school."

After graduating from the University of Connecticut School of Medicine in 1978, Mahoney did a three-year family practice residency in Abington, Pa., just outside of Philadelphia. During his final year, he served as the chief resident. Since July, he has been living in Mattapoisett, Mass. and working as the director of emergency services at Parkwood Hospital in New Bedford, as well as the part-time campus physician at Southeastern Massachusetts University.

"In a year or so I'll be going into private practice with a friend in the New Bedford area."

Currently, Gail D'Amico, '79, is in her first year at the Tufts University School of Veterinary Medicine in Boston. Since competition for admission to veterinary school is exceptionally keen, her preprofessional advisor at WPI suggested that she begin applying several years before she actually planned to enroll.

Prior to her admittance to veterinary school, D'Amico entered a PhD program in pharmacology at the Mount Sinai School of Medicine in New York City, where she was an N.I.H. trainee. During her second year at Mount Sinai, she applied to Tufts, where she was accepted the second time around.

She reports, "I regretted leaving before completing my PhD, but I decided to enter Tufts since it was likely to be a once-in-a-lifetime offer. Mount Sinai graciously awarded me a master's degree in pharmacology and a leave of absence should I decide to return at a later date."

D'Amico gives her WPI advisors a lot of credit for guiding her into veterinary school. "They helped me plan my undergraduate program and tailor my projects towards medicine. They compiled a composite pre-vet recommendation from a committee of 12, which was praised during many of my graduate and vet school interviews."

She found a few drawbacks with her WPI Plan background, however. "I was at a disadvantage with respect to my background in premedical basic science courses, as compared to other applicants. In this respect, I do not feel that seven-week courses are adequate in providing the depth and amount of subject coverage that most students obtain in semester-length courses."

She also had to get used to board-type exams in both graduate and veterinary schools. Since most of her exams at WPI were take-home research types, she was unfamiliar with the typical exams used at most medical schools.

Gail D'Amico, '79

"However," she goes on to explain, "I was able to really push the advantages of WPI in my essays, as well as in my interviews. I feel that the individuality of my program added considerably to the strength of my application. My research projects were much more extensive than those of most other applicants, and I was already familiar with standard 'protocol' in literature searches, as well as with presentation of scientific material. Because of this, I was able to converse in a sophisticated manner with my interviewers in many related research fields, and I was aware of many current problems facing medicine and basic science research."

Finally, D'Amico feels that WPI contributed to her independence as a student in science. "It taught me how to find answers, where to find them, how to contact people who would know. I consider this more important than rote memorization of course work, since there is such a high probability of obsolescence in a fast-paced discipline like medicine."

John Smith, '76, is now attending the State University of New York (SUNY) at Buffalo (PhD 1982) and SUNY at Stony Brook (MD 1984). In Buffalo, he is completing a doctoral degree in the Department of Experimental Therapeutics at Roswell Park Memorial Institute, the comprehensive cancer institute of New York State. He has finished research on his project regarding the effects of cancer chemotherapeutic agents on human immune responses and is currently writing papers for publication . . . as well as his doctoral thesis.

Smith says, "Roswell Park receives approximately 100 applications for its five funded graduate positions each year. All accepted applicants must have done undergraduate research. At WPI, I worked on two different projects. The first, with Dr. Peura in biomedical engineering, studied the feasibility of impedance plethysmography in diagnosing peripheral vascular disease. On this project I was a member of the clinical testing team which interacted directly with the patients."

His other project involved the preparation of human erythrocyte vesicles [small fragments of red blood cell membrane] under the direction of Dr. Theodore Crusberg in life sciences. "This particular project provided a smooth transition into graduate school, as I became involved in an application of this work—the use of erythrocyte [red blood cell] vesicles to carry drugs. I found my academic advisor, the late Dr. Richard Beschle, and my project advisors very supportive of my plans to go on to graduate and medical school."

A second-year medical student at Stony Brook, Smith also serves on the admissions committee. "The committee likes to see evidence of interest in medicine beyond the classroom. This is usually satisfied by an undergraduate research project and/or clinical exposure. My projects at WPI gave me both."

Smith's present plans are to complete a residency in medicine following graduation and possibly to continue on for subspecialty training. Eventually he hopes to combine clinical practice with part-time research and/or teaching.

One former WPI preprofessional student, Dr. Bruce Croft, '75, has branched out into a unique area of medical practice. He recently opened offices in Worcester and Holden for the practice of podiatry, sports medicine, and surgery of the foot. He graduated from the Illinois College of Podiatric Medicine in Chicago and completed his surgical residency at Edward J. Hines Veterans Administration Hospital, Chicago, where the hospital's chief of surgery appointed him senior podiatric resident.

The author of several articles regarding his specialty, Croft says it was largely due to the WPI plan that he completed a fellowship program at Worcester Foundation for Experimental Biology in Shrewsbury.

"While working on my MQP, I was offered a Junior Fellowship at the Foundation," he explains. "Later I received a full fellowship." His experience at the Foundation led him to a stronger interest in medicine and finally to his chosen profession of podiatry.

Bruce Croft feels that his WPI preprofessional background has been an important stepping stone in his medical career.

Paul Chenard, '79, believes that his involvement with the preprofessional curriculum at WPI was a positive one. "My project work resulted in my being given much more responsibility and independence in conducting the research project on which I worked throughout my recent stay at Yale," he reports. "In addition, it was easy for me to settle into the project-oriented environment I found myself in there. . . . I strongly believe that my performance at this research job and the subsequent recommendation I received from my employer influenced my being accepted to medical school."

At the present time, Chenard is a medical student at the University of Connecticut, where he was accepted last year. Prior to his acceptance, he worked as an assistant in research in a laboratory at Yale University School of Medicine, where he did research in renal physiology. He was hired as an assistant in research at Yale a month after graduating from WPI, and he remained there until he entered medical school.

Chenard says that his WPI preprofessional background was a definite plus. "I don't think I could have received better premed training anywhere."

Brian Timura, '78, agrees. "WPI was extremely beneficial, not only in helping me gain entrance into medical school, but also in helping me obtain the best from my medical education."

Currently, a third-year student at Tufts University School of Medicine, he admits that medical school admissions officers were not always aware of what WPI has to offer the preprofessional. Invariably he was asked during his interviews, "knowing in high school that you wanted to enter medical school, why did you choose WPI for your undergraduate education?"

Timura had the answer. Basically, he was attracted to WPI because of its unique curriculum. "All three projects, as well as the competency exam were valuable and challenging," he'd explain. "The general experience of planning my own curriculum, tailored to my project work, and not having to choose courses to merely fulfill credit hours, as is true in most colleges, was an educational experience in itself."

Timura appreciated his advisor's efforts in assisting him with his program plan. "He encouraged me to do at

least one project in a hospital setting. This enabled me to become familiar with physicians outside of the WPI community and allowed me to ask pertinent questions about gaining entrance into medical school." Since the physicians Brian worked with were in academic medicine, associated with the University of Massachusetts Medical School, Timura was able to get first-hand knowledge about medical education.

Timura reveals that his experience of taking the competency exam at WPI has been a decided asset. Much of his work takes place in hospital wards, where he has to take a history and perform a physical exam on a patient, and then, in a limited amount of time, write a report and read up on his patient's problems.

"Because of the limited time, I have to be selective in what to read," he reports. "Then, I may have to present the patient's history and physical to a group of physicians. I sometimes have to answer their questions about the history of the patient, as well as questions about his or her diseases. This procedure is many ways similar to taking and preparing for the WPI competency exam. I am grateful that I had that opportunity as an undergraduate."

BESIDES THE "HANDS-ON" EXPERIENCE gained through the projects and the competency, there are many other opportunities for the preprofessional student at WPI, according to Dr. Theodore C. Crusberg of the Department of Life Sciences, who is the premedical advisor. The student is made aware right from the beginning, that he may pursue any degree program at WPI. If necessary, he may take specific courses for admission to the professional school of his choice.

"There are no hidebound rules concerning majors for the preprofessional student at WPI," Dr. Crusberg says. "Not everyone who plans to go on in the medical field concentrates in chemistry, biology, or the life sciences. Just last year, for example, Nancy Berube, '81, graduated with a degree in humanities (dramatic literature). She is now at the University of Massachusetts Medical School."

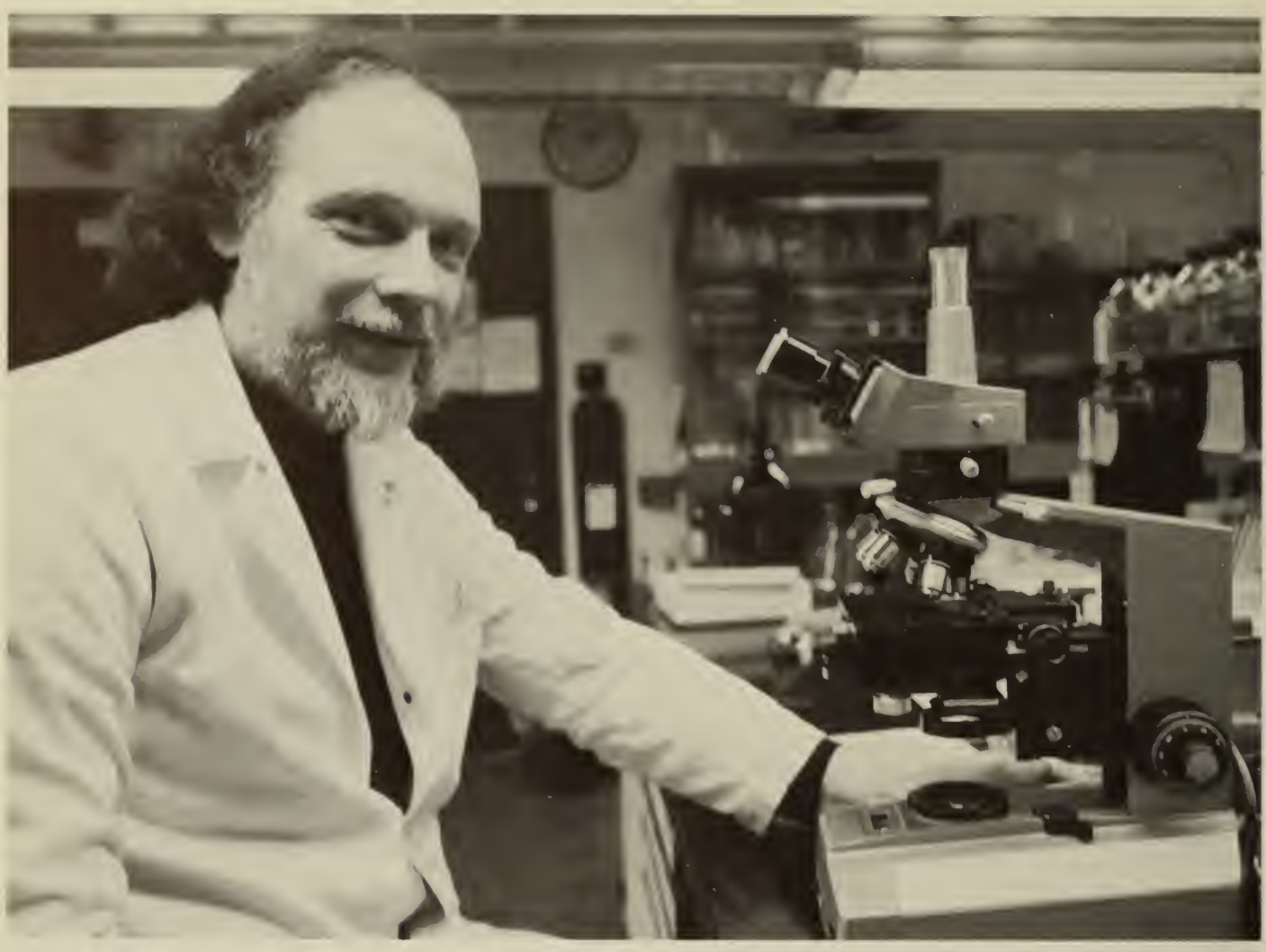
Generally, students planning a premedical, predental, or preveterinary education at WPI take two courses each in life sciences, physics, introductory chemistry, organic chemistry, English composition, and calculus, all of which are typical admissions requirements at most medical schools. Additional specific courses, such as psychology, biochemistry, genetics, embryology, and certain laboratory courses may be required by various medical schools.

"Veterinary schools may also require that undergraduate students work with both small and large animals in addition to their normal college experience," Crusberg adds. "We try to let our advisees know early on just what courses and experiences are necessary so they can plan their curriculum accordingly."

Nancy Berube, '81

There are a number of criteria used by professional schools in making admissions decisions. "Documentation of scholastic ability is one important aspect," says William R. Grogan, '46, dean of undergraduate studies at WPI. "Grades in courses for sophomore through junior years are most important, since applications are usually filed between the junior and senior years. At WPI, preprofessional students should set a goal of at least 50 percent distinctions in grades for medical and dental schools — as a minimum effort."

Although WPI does not use a traditional grading system, the registrar, if necessary, will compute a nationally-recognized Quality Point Average (Acceptable = 2.75; Distinction = 4.0) and forward it to the medical, dental, or veterinary school to which the student applies. Grades in specific courses, especially in organic chemistry, may often be considered important criteria by medical schools in making a decision on a student's application. Completion of all preprofessional course requirements is advised during the student's first three years as an undergraduate, so that he or she may take the standardized examination required of virtually every applicant to professional school.



Prof. Ted Crusberg

Another criterion by which an aspiring professional is judged is his or her score on the Medical College Admissions Test (MCAT); the Dental Aptitude Test (DAT); the Veterinary Aptitude Test (VAT); or the Graduate Record Examination (GRE). These tests are the only criteria which serve as common yardsticks for all applicants and, as such, may be considered important in decision-making by many admissions committees.

How do WPI students score on these difficult, standardized tests? "Remarkably well," comments Crusberg. "I recently received a summary of the latest MCAT results. Students who earned their BS at WPI and took the test were consistently above the national average in every single area: biology, chemistry, physics, science problems, reading skills, and quantitative skills. What particularly impresses me," Crusberg remarks, "is that the average reading skills score is 15 percent above the national average, which indicates this is a very literate group of young people. So far, those taking the test and applying to medical schools have been exemplary."

Besides testing, letters of recommendation are another important factor in the application process. During terms C or D of the junior year, students meet with the preprofessional advisor and establish a committee consisting of several faculty. This committee is usually made up of the academic advisor, the IQP advisor, the MQP advisor, and the sufficiency advisor. Also included are other faculty, acquaintances, and supervisors who have been able to observe the student under a variety of conditions.

The number of people serving as the student's committee is determined by the student. Off-campus people, including professionals (doctors, dentists, veterinarians), may be committee members. After determining the committee, the preprofessional advisor contacts each person directly and provides a form on which a paragraph or two concerning the student's personality, motivation, character, creativity, integrity and several other qualities is written. From these forms a final, single letter of recommendation is generated.

"These letters are a prime element in the admissions process," Crusberg says. "They give the professional school admissions officer personal evaluations that don't show up in the student's transcript or MCAT score."

The application process itself is not too difficult—merely tedious. Most medical and dental schools now demand that the student apply through the American Medical Colleges Application Service or the American Association of Dental Schools Application Service. These services permit a student to make out a single application, report his or her MCAT or DAT scores, and submit one transcript. That information is then sent to each medical or dental school as designated by the student.

After reviewing credentials, a professional school may wish to have the student visit for an interview. The interview is generally conducted by faculty, clinicians, and students of the host school, and the format can be variable and often unpredictable.

Crusberg advises: "The student should have several experiences related to medicine such as working as a medical or hospital technician, or service in a public agency or other relevant people-oriented activity to discuss. Project efforts, especially in the area of medicine, should also be spotlighted."

Following the interview, the applicant may have to wait from a few days to several months before learning of the decision of the professional school admissions committee. For almost everyone, rejections far outnumber acceptances. For every two qualified candidates, one is rejected in medicine, and there is even a smaller acceptance rate at veterinary schools. The competition for dental schools is not as intense, and the chances of admission there are better.

Since only one out of two qualified applicants is accepted to medical school, planning an alternative career is essential. About 70 percent of those from WPI who receive the highest recommendations are accepted into medical school. "This is why," says Crusberg, "each preprofessional student should be concerned about other career plans, which might include graduate school, teaching, or business."

The future for seniors who are not accepted right away at medical school can have a silver lining. Many WPI students find that admission is possible after two or three years of graduate school or research activity. Also, a few WPI students have entered foreign medical schools in Mexico, Greece, Poland, and the Dominican Republic, with the hope of returning to the U.S. to complete their clinical training or as residents or interns.

"Financial need should not deter a student from obtaining a medical or dental education," Crusberg continues. "Funds may come through family resources, loans, and scholarships. More than half of all students enrolled in U.S. medical schools receive financial assistance. There is money available for those wanting to go into medicine."

And those students who find their way into medicine along the preprofessional route at WPI, will discover that their "untraditional" premed background can make them more adaptable to change. Not only will they have been well versed in the basic sciences, they will have had to face and master the unpredictables that inevitably crop up in project work and in the competency exam. In a world of expanding medical technologies, the WPI premed student turned doctor may be less likely than most to suffer from future shock.

"Technology is here to stay," says Ted Crusberg. "Ten years from now, medicine will be profoundly changed by advancements in engineering and computer science. I feel a doctor needs an engineering type of education to keep up with the state of the art."

1918

Currently, **George Gove**, who is retired from Behr-Manning Corp., resides in Holden, Mass. His wife, Helen, passed away in August. She was the sister of the late Ned Nutter, '13.

The Atwater Kent lecture hall has been named the Newell Lecture Hall as a tribute to Professor Emeritus **Hobart H. Newell**, who served on the WPI electrical engineering faculty from 1921 to 1965 and, who since his retirement, has served as consultant to the Alden Research Laboratories. Throughout his professional career, Prof. Newell was a well-known consultant to radio stations. He is credited with developing the electrical engineering department's program in electronics.

1927

Charles Moore recently received a 450-mile Red Cross certificate for swimming 450 miles in Cleveland's Cudell Recreation Center pool. He swam that distance in the pool between October of 1971 and June of 1981.

1928

The **John Driscolls** visited Bermuda last fall. While on vacation, they enjoyed swimming. John writes: "Peg and I were in the water mornings at eight to whet our breakfast appetites."

Charley Durbin says, "Looking forward to '83 and our 55th." He and Sue exhibited antiques at 16 shows this year, down from 19 last year. "The economy is hurting the antique business." They did most of their traveling around the New England States, but did get to the Heisey collectors' convention in Newark, Ohio last June.

In addition to such hobbies as gardening, woodworking, and furniture refinishing, Mildred and **Ted Englund** continue to travel. In 1980 they visited their son, Paul, and his family in Nairobi, Kenya. "Paul was on loan from the Johns Hopkins Medical School at a research lab in Kenya." While visiting their son, the Englunds had an opportunity to enjoy several safaris "which turned out to be fantastic experiences." During the past summer, they spent several days in Montreal, Ottawa, and Toronto, and continued by train to Jasper, and through the Canadian Rockies to Glacier National Park. "A truly marvelous trip!"

W. Bigelow Hall and his wife are living in retirement in Redington Beach, Fla., where "Big" spends much of his time golfing, tending 20 rose plants, bird carving, and walking the beautiful gulf beach between swims. He has served as the head of the local civic association, as chairman of a committee to rewrite the town charter, and for the past two and a half years as chairman of the town park board. "We summer in Winchendon every year or two. This year we went to the canyon country in Arizona and Utah." The Halls have been married for over 52 years.

Frank King continues as president of the Massachusetts Municipal Wholesale Electric Company (MMWEC), and is currently concerned with the nearly completed Stony Brook Intermediate Project in the Ludlow area. The first municipally-owned power plant, Stony Brook is large enough to light up the cities of Springfield and Worcester combined and is a milestone in New England's electric power industry. It is reported that the plant will be able to supply municipalities with power priced 20 percent lower than that from private utilities. King says that the plant will also save New England thousands of gallons of fuel because of the efficiency of its new combined cycle turbines.

Early on, the plant came under criticism when it was learned that it would be using No. 2 oil, a commodity considered both expensive and not always plentiful, King noted. He pointed out, however, that the plant's technology actually reduces the amount of oil being used by New England utilities because of its efficiency. He estimated that for every one percent conserved through efficiency, about $1 million is saved.

When the plant is fully operational by the end of 1982, it will be able to provide enough power to run one million automatic washing machines, or more than five million 100 watt light bulbs. It was dedicated in November by Gov. Edward J. King in a ceremony attended by a host of dignitaries.

In October, **Fred Knight** rounded out ten years of retirement, and says "have become so happy with it that I don't miss my job in the least, much as I enjoyed it for 34 years." He and his wife take part in home town activities. They escape from Corning, N.Y. to southern California for the three worst months of winter.

Ralph Lundberg has been doing consulting work ever since he retired. He also serves as a volunteer helping some of the neighborhood widows with their house and yard problems. He is on the board of directors of his neighborhood association and is in charge of the neighborhood road committee, which is responsible for keeping area roads in good shape. Periodically, he serves on the night watch in his vicinity. Weather permitting, he does a lot of biking, walking, swimming, golfing, bowling, gardening, and house painting. He and his wife have traveled to Scandinavia, California, Florida, and Bermuda, among other places. This winter, they plan to go to Florida.

Andy Maston plays golf several times a week. "But already, this fall, I've started shoveling snow. Three inches yesterday." He also walks and exercises. He has been involved for some time with local politics, and has spent a few years on the local hospital board. He has five children, with two being engineers and three, teachers. A couple of years ago he served as an Alcoa consultant for seven weeks at the same GE plant in Pittsfield, Mass., which his class had visited when he was an EE student at WPI.

James McCarthy sends his best to all who plan to make the reunion. His wife is an invalid and requires much care. "No travel time for me."

Karl Penney reports that the following class members regularly attend Tech Old-Timers meetings: **Ted Englund, Karl Penney, Les Sarty, Roger Tarbox, Chet Doe, Forrest Nelson,** and **Donald Reed**. "**Gabe Bedard** comes from Springfield at least once a year to check on the treasurer of the 1928 55th Reunion Fund."

Hal Voigt's wife, Helen, passed away last September. In December, he was slated to leave Dayton to visit his daughter and grandchildren in Burbank, Calif. He was also planning to visit his son and grandchildren in Portland, Oregon. He hopes to attend the 55th.

Winslow Wentworth has just started his eighth term as president of the Franklin County Home Care Corporation which serves the 26 Franklin County towns and four towns in Worcester County. In addition, he is a trustee of the Farren Memorial Hospital, where he is chairman of the building and maintenance committee.

1929

Wayne Berry writes from Spring Hill, Fla. that there are so many activities in his apartment complex "there are no dull moments." He serves as editor of the *Evergreen Woods News*, which comes out once a month. He and his wife, Julia, have a one-bedroom apartment in the planned retirement community.

The couple enjoys the social and group activities at the retirement center, including monthly birthday parties and wedding anniversaries. (They celebrated their 50th in 1980.)

Before moving to Evergreen Woods, Wayne taught Sunday School at the Methodist Church. He plans to resume some teaching soon at the complex. His booklet summary of Henry George's book, *Progress and Poverty*, is now in its second printing.

Until his retirement a few years ago, Wayne was an electrical engineer at Underwriters Laboratories for 40 years. During his last 25 years with UL, he and his wife were volunteer workers at Long Island's Nassau County Hospital for eight years, and in 1971 they received a plaque as the hospital's outstanding volunteers. Wayne was awarded a gold pin for 1,000 hours of service.

1930

Charlotte and **Charles Cole** celebrated their golden wedding anniversary on August 23, 1981 in the same setting as their marriage in 1931 in Holliston, Mass. The house, now the Holliston Historical Society, was formerly the home of the bride's family. Mrs. Cole graduated from Mount Holyoke College. Her husband graduated from WPI and Harvard Business School. For many years he was with Standard Oil of New Jersey. In 1950 he moved his family to Venezuela to become head of the Creole Petroleum Corp., a subsidiary of Standard Oil Co., now Exxon. The Coles have four children and 11 grandchildren. Mrs. Cole has long been interested in sculpture in stone and steel, oil painting, and ceramics, and has had several one-woman shows. She is the current winner of a first place in sculpture at the Hyannis Members' Art Show and an honorable mention winner in the New England Show at Hyannis. Her husband was active in church and civic affairs. Since his retirement, he has become an enthusiastic tennis player, woodcarver, and carpenter.

The four daughters of Mabel and **Pete Marsaw** held a reception on August 29, 1981 in Worcester in honor of their parents' 50th wedding anniversary. Over 150 people attended the celebration. Pete is still doing some consulting work.

J. Lloyd Richmond (Jack) writes that he was responsible for recruiting Cookie Price, '30 for WPI in 1925. Both Jack and Cookie were from West Palm Beach, Fla. Jack is now back in the same function as area chairman of the Miami Alumni-Admissions program. He is charged with overseeing the admissions recruitment activities of Miami alumni.

Dan O'Grady and **Carl Backstrom** represented the Class of 1930 at the dedication of the new Atwater Kent building on Oct. 2, 1981.

You will recall that our 50th anniversary gift was to be used for a new classroom in this building. A very nice plaque is on the wall of this large second floor classroom marked: "Given by the Class of 1930 on the occasion of their 50th anniversary." Make sure you visit the new modern Atwater Kent building on your next visit to WPI, and check on our room.

After our 50th banquet in June 1980, we had a few dollars left over and they have been on deposit in the bank. Since the alumni office will take care of any mailing we wish to put out, I have talked to Dan O'Grady and we decided to close the account, and donate the money to the WPI alumni fund for 1981-82. So, with a little help from Dan and me, we will show a $100 gift to the fund from our class.

Carl Backstrom, Class Secretary-Treasurer

1931

Phyllis and **Al Demont** were injured in a head-on crash with a car load of teenagers on Sept. 5th, but are recovering nicely. Al suffered, among other things, five broken ribs and multiple bruises. He says, "Phyllis was bruised severely, from the seat belt, probably, but with little doubt would have been pitched through the windshield without the belt." Both are now home from the hospital.

1933

John Magee continues with his consulting and research assignments with Elevator Research Co., New York City. He holds fourteen elevator patents.

1934

Luther Leavitt, who has served as vice chairman of Melinz Industries since 1977, also likes to create speeches. His "Biggest Little Battle Bunker Hill" has been given many times in the New England and Cleveland areas.

Paul Sullivan spends his winters in Englewood, Florida and his summers in South Harwich, Mass.

1935

Alfred Cantor owns Altun Enterprises in Greenbrae, San Rafael, Calif.

Guests may find it a bit difficult to sleep or even sit at the home of Sue and **Ted McKinley** in Wilmington, Delaware. That's because every available inch of space is filled with McKinley's retirement hobby, strawflowers that he grows at the back of his large plant-filled yard. And 35,000 individual strawflowers set in white plastic tubs would certainly take up plenty of room.

By the time of the first killing frost, McKinley will have picked more than 150,000 flowers from nearly 900 plants, placed in long rows and held in place by more than three miles of twine.

McKinley says he got into strawflowers because his wife was in charge of flower arranging at a nearby museum. Now, what started as a hobby, has grown into a business called Barley Mill Bouquet. And what a business! His strawflowers can be found at Longwood Gardens, Colonial Williamsburg, and Old Sturbridge Village, to name a few places. One Main Line flower arranger orders about 1,500 flowers a week.

Of some 300 test plants, McKinley has 18 new varieties that he is testing. He plans to introduce six next year, but they won't appear on the market. He wants to keep them for himself.

The McKinleys separate their flowers into two groups, the color-coordinated ones and the mixed bouquets, which are sold to various museums and gardens. Serious flower arrangers buy the former group, paying up to $78 a thousand, plus transportation. Most customers, however, pick them up at the McKinleys'. Along with the strawflowers, McKinley raises German statice in another plot and harvests about 300 pounds of this popular flower for drying.

Ted McKinley retired as a pigments research supervisor for du Pont some time ago, but he never did stop working.

1936

Scott Goodwin writes that he is very busy taking care of his own place, helping build a two-car garage for his son-in-law, and helping the Hartford Insurance Group on a design and construction problem. He also works with the American Nuclear Insurance Co. on occasion.

Ed Guild is employed part time at the Reynolds Metals Co. fabrication plant which is part of the can division. The plant makes equipment to manufacture millions of cans for the beer and soft drink industries.

1937

William Carew, president of the Class of 1937, has been elected president of the National Council of Engineering Examiners. Also, he recently received the NCEE Distinguished Service Award.

1938

Recently, Louise and **Dick Burke** returned from a trip to Acapulco, the Panama Canal, Columbia, Santo Domingo, BVI, St. Thomas, and San Juan.

Warren Spofford has retired as account executive from Norton Co. and is residing in Nashua, N.H.

1939

John Backes retired last August from Waterbury Farrel-Textron and currently lives in Mesa, Arizona.

Robert Hamilton, former manager of fleet sales for Mobil Oil Corp., retired recently. He is currently located in Bridgton, Maine.

O.J. Karna is a senior project manager at Rust Engineering Co., Birmingham, Alabama.

1940

Richard Mayer retired in August and is now a resident of Intervale, N.H. He had been a purchasing specialist for Monsanto.

1941

William Carroll, Jr. is retired and living in Tarpon Springs, Florida.

George George and his son, **Doug George, '69**, have taken over the management of the new, totally renovated "9-20" Motel in Northboro, Mass. and of the West Boylston Motel in West Boylston. The "9-20" features light housekeeping units and Diamond Jim's Restaurant, as well as a heated indoor pool and can clearly be seen by driving on Rte. 9. The Georges, who manage other properties in eastern Massachusetts, are also home builders.

1942

WPI Prof. **Roy Bourgault** has been selected by the Michelin Tire Company to provide his failure analysis expertise in accident cases involving their tires.

1943

Arthur Grazulis holds the post of principal process control engineer at Diamond Shamrock Corp., Painesville, Ohio.

1944

Dr. **Kenneth Cashin** resigned as associate dean of engineering at UMass in August. He will return to the Chemical Engineering Department for three more years.

John Chandler has been named a vice president of Borg-Warner Corporation's York-International operation. He is responsible for all marine, military and government sales of the company's air conditioning and refrigeration equipment in the U.S. and in international markets. Additionally, he heads York's government relations activities in Washington, D.C. He joined the York division of the firm in 1944 and has served in increasingly responsible capacities. Most recently, he was director of York-International's Marine, Military and Government Department.

Chandler is active in several Washington area professional and community organizations, including the Government Contracts Council of the Machinery and Allied Products Institute. He is a director and chairman of the government relations committee for the Alliance for a Responsible Chlorofluorocarbon Policy. Also, he is a member of the Society of Naval Architects and Marine Engineers, the American Society of Naval Engineers, and the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Associated with the Kiwanis, he directs the activities of that organization's orthopedic clinic at Sibley Hospital. He serves as treasurer of the University Club of Washington, D.C. and belongs to the Newcomen Society of North America, the U.S. Navy League, and the Propeller Club.

Harold Davis continues as president and general manager of Electro-Flex Heat, Inc., Bloomfield, Conn. His firm has concentrated on two specific types of flexible heating elements: flat elements and molded elements, both stock and custom. It provides a complete line of drum and pail heaters, based on well developed capabilities in the flexible heating element area. It also offers a series of indicating and non-indicating temperature controllers for the precise control of processes to 500 degrees F.

There are many applications for Electro-Flex heating elements in industry. For example, Rockwell installs flexible neoprene rubber heating elements on some of its aircraft at the duct inlet point to keep the generator cooling duct open when icing conditions are encountered in flight. A flexible silicone rubber blanket on the Better Pack 555 Electric Tape Machine (Better Packages, Inc.), makes gummed tape glue stickier. A molded silicone rubber heater used by Martin Marietta on the Viking spacecrafts ensured the maintenance of the fuel temperature. Electro-Flex heaters are also used in personal products, such as footbaths.

Everett Johnson, manager of the Beacon Research Laboratories of Texaco, Inc., has been elected to the board of directors of the United Way of Dutchess County in New York State. He will assist in making policy decisions that will affect the operations of the United Way, including the allocation of funds, and community planning. In other areas, Johnson serves as director of the Council of Industry of Southeastern New York and has been busy with a number of civic, social, political, and religious organizations. He belongs to the Society of Automotive Engineers and to the Southern Dutchess County Chamber of Commerce.

Erling Lagerholm's corporate offices (Norwood Group International) have been moved from Boston to Bedford, N.H.

Paul Pressel serves as a senior staff engineer for Bendix Electric in Sidney, New York.

Dr. **Jack Queijo** has been named director of the NASA Langley Visitor Center in Hampton, Va. He retired from NASA's Langley Research Center in 1980 after 36 years of service, and brings a wealth of experience to his new post. In the early days of America's space program, he worked closely with the original seven astronauts and to some extent with Dr. Wernher von Braun. At NASA he played a key role in determining lunar orbit rendezvous techniques, worked with the earliest simulated lunar landings and was involved with simulations for the Gemini missions. Later, he dealt with research in aerodynamics of swept-wing aircraft, stall/spin problems and unsteady aerodynamics.

Queijo finds his new position "extremely interesting because of all the changes and advances that are still occurring. The most impressive thing about the Visitor Center is that it's a living organism rather than a museum. It's constantly being changed and kept up-to-date." He looks forward to "making the public more aware of Langley and NASA-wide contributions to aeronautics, to technology and to the economy."

Bill Raymond has held his current post as chief of Gannett Fleming's Traffic Section since 1967, following a three-year stint as manager of the firm's Pittsburgh office, and years of highway design work. He will soon be celebrating his 25th anniversary with the company. One of his duties during the past fifteen years, has been keeping careful plottings of traffic volumes on the South Bridge in Harrisburg, Pa. He gets quarterly data on traffic counts for other areas throughout Pennsylvania, and wanted to see how the volume would grow.

Initially, three alternate schemes for traffic maintenance were developed for the bridge. The plan eventually adopted required fewer changes in traffic patterns. Says Bill, "People get used to the traffic patterns. If patterns are constantly being changed, there's more chance for confusion."

Last year, Bill served as a member of the conference committee at the Specialty Conference on Rehabilitation and Reconstruction of Major Highways held in New Orleans, La.

1945

John Bayer, as a guest columnist, wrote an article about the American automobile industry for the *Patriot*, a newspaper in Webster, Mass. in August. He is president of Bayer Motors, Inc. and treasurer of the Bayer Leasing Corp. of Dudley. Currently, Bayer's GM dealership is one of the oldest GM outlets in New England. He handles Cadillacs, Pontiacs, Oldsmobiles, as well as American Motors vehicles.

Robert Buck, who retired from the Federal Aviation Administration in 1979, resides in Bethesda, Md. He holds a master's degree from George Washington University.

Burton Hinman serves as vice president of Parajett AB of Landskrona, Sweden. He is located in Palatine, Illinois.

Roger Perry, director of public relations at WPI, has been elected a regional director of the New England chapter of the Public Relations Society of America. He recently became a certified graphoanalyst, receiving his diploma from the International Graphonanalysis Society.

1946

Rodney Chase is with Rodel, Inc., Newark, Delaware.

Alfred Wood serves as a bridge engineer for the Southern Pacific Transportation Co., San Francisco.

1947

John Hambor is now president of his own company, HV Component Associates, Inc., in Howell, N.J. The company just finished a very successful first year manufacturing high voltage rectifiers and multipliers for use on CRT's and X-ray machines, and other equipment.

1948

Harold Devlin serves as a project manager at Brown & Root, Inc., Houston, Texas.

1949

John Yaeger has been named manager of marketing communications in the Modicon Division at Gould, Inc., Andover, Mass. In this post he supervises all advertising, sales promotion, market research, visual aids, industry shows, and technical exhibits. Initially, he joined the Modicon Division as manager of marketing communications. Previously, he was account executive for an advertising agency in Philadelphia for five years. From 1954 to 1967 he was on the corporate marketing staff of Ametek, Inc., performing market research and product planning for the company's line of mechanical testing equipment and fluid controls.

1950

James O'Connor holds the post of vice president of finance at Hill Holiday Connors Cosmopolos in Boston.

1951

Dr. **Robert Zimmerer** serves as a consultant at Scientech, Inc., Boulder, Colorado. He writes: "I have retired from an active role in the company I founded in 1968."

1952

Frank Flood, Jr. is chief estimator at Perini Corporation in Framingham, Mass.

Lee Tuomenoksa has been elected vice president of Customer Services II, Area 44, at Bell Laboratories. In this newly-created post, he will be responsible for developing business communication products and services for the Bell System. He joined Bell Labs in 1954, developing the database and switching network control for an experimental electronic central office in Morris, Ill. In 1966, he was named head of the Electronic Switching Maintenance Planning Department, and oversaw the design of program and circuit facilities for detecting and analyzing troubles in No. 1 ESS. After becoming assistant director of the No. 4 ESS Switching System Laboratory in 1974, he was promoted to director of the laboratory in 1976. Subsequently he was named director of the local ESS Applications Laboratory, director of the Digital Terminal Laboratory, and executive director, Transmission Terminals and Maintenance Division. In 1979, he was appointed executive director of Data Communications, the post he held prior to his most recent advancement.

As a new vice president, Tuomenoksa says that he has two goals for his company: "To work more closely with Western Electric and AT&T and to become known as leaders in good management and leaders in how well we treat people." Earlier in his career, while working as a department head responsible for No. 4 ESS system design and operational program development, he became aware of how critical "people" issues are. "I started to realize the technical problems were often a lot easier to solve than were the people problems."

Possessed of a wry sense of humor, Tuomenoksa has put out a 16-page guideline for achieving a project failure. One guideline is "Always establish a schedule before you know what the project requirements are." Another is "When people come to you with their problems, make it clear that you do not want to hear them."

Married and the father of three, he tries to keep his weekends open for sailing (a 16-footer), building doll houses, and photography. "I try to limit my hours at work so I leave time for other things. I can be more effective that way."

Lee Tuomenoksa reflects with emotion on his rise at Bell Labs. "To come to America (from Helsinki, Finland) not knowing any English and with only 20 bucks in my pocket, and I'm now a vice president of Bell Labs! I'm flabbergasted! Not in any other country in the world could this happen, except America."

1953

Dr. **John Coupe** has been appointed as vice president for finance and administration at the University of Maine at Orono. He has been serving as acting vice president since October 1, 1979. In that capacity, he is responsible for the overall financial affairs and the non-academic administrative affairs of UMO. He also supervises the operations of the physical plant, police and safety, employee relations, public information and central services and the business manager while maintaining a financial responsibility in physical education and athletics. He first became a member of the faculty in 1958, and holds the academic rank of professor of economics. From 1969 to 1976 he served as chairman of the economics department. In 1961-62 he was an assistant professor of economics at Kent State University. He holds a master's degree and PhD in economics from Clark University.

Dick Davis is now president of CCI, Inc., Waterford, Conn. He is a WPI trustee.

Phil Simon writes that he is in his 24th year with IBM and loves it. "I hit the computer business just at the right time." Currently, he has responsibility for all of IBM's business with Rockwell nationally and internationally. The job keeps him traveling. He has quite a few salesmen, technical support personnel, and managers working with him. He says that he and his wife, Pat, are golf nuts. "We will go anywhere to play in a tournament." They particularly enjoy playing in Hawaii.

Donald Taylor is the self-employed president of his own business in Burnsville, N.C.

1954

Robert Labonte serves as associate department head at Mitre Corp. in Bedford, Mass.

Robert Luoma continues as a senior systems engineer at GE in Sunnyvale, Calif. He and his wife, Alice, now reside in San Jose.

Donald E. Ross has been promoted to executive vice president and chief operating officer of MPB Corp., Keene, N.H. He joined the company in 1962, most recently serving as vice president and general manager of MPB's split ball bearing division in Lebanon. He is a director of the National Bank of Lebanon and of the Lebanon Industrial Development Association. Also, he is a corporate member of the Mary Hitchcock Memorial Hospital. A past president of the Lebanon Chamber of Commerce, he has been a director of the Upper Valley United Way and of the local Boy Scout Council, as well.

1955

Brian Kelly was recently appointed vice president of customer services at Bell Telephone Company. In his new post he directs some 18,000 employees in construction, engineering, installation, repair, and business offices. He is headquartered in Pittsburgh, Pa. Previously, Kelly was Bell's vice president and general manager of its western Pennsylvania region. He now is in charge of all of Pennsylvania for the company, an area which services some eight million Bell telephones. In 1955 he joined Bell and was subsequently promoted to various posts. He holds a master's degree from MIT and attended LaSalle College and Cornell University. Earlier he served in the Army Signal Corps. Currently he is a captain in the Army Reserves.

1957

Dr. **Robert Crane** serves as research professor of engineering at Thayer School of Engineering, Dartmouth College, Hanover, N.H.

Stuart Hamilton has been appointed product manager of Aritech Corp. in Framingham, Mass. He comes to Aritech from Fenwal where he was a project engineer involved in smoke and fire detection. Prior to that he operated his own alarm installation company. Aritech manufactures intrusion detection systems and equipment and a wide range of other burglar and fire alarm products.

James Richards serves as president of Flo-Lube Inc., Sanderson, Fla.

Richard Silven was recently appointed group vice president for components of Burndy Corporation, Norwalk, Conn. In his position he is responsible for world-wide operations of the company's Components Group, which designs and manufactures electronic connectors for commercial, consumer, and industrial products. Formerly, he was international group vice president for Harvey Hubbell. Before joining Hubbell, he was vice president and general manager for Burndy in Detroit. He has an MBA from Harvard Business School.

1958

Prof. **James Demetry**, chairman of the division of interdisciplinary affairs and professor of electrical engineering at WPI, was recently elected selectman in Holden from a field of five candidates. The special election was for the eight months left in the three-year term of a selectman who resigned for health reasons. In his first bid for elective office, Jim received 599 votes, 224 more than the second place candidate. Previously, he was a member of the Holden Planning Board for nine years.

Carlton Staples, professor of mechanical engineering at WPI, is on leave of absence at the Colorado School of Mines. During the summer, he attended seminars in Salt Lake City, worked on computer graphics software at the University of Utah and Brigham Young University, and spent time at the Air Force Academy and the University of Colorado.

William Wesolowski holds the post of section manager for Raytheon Co. in Sudbury, Mass.

1959

Dr. **Mohammad Amin** serves as supervisor of the stress and probabilistic analysis section for Sargent and Lundy Engineers, Chicago, Ill.

William Bailey is an account manager at Lubriquip in Cleveland, Ohio.

Roberto Jaramillo holds the position of ambassador-consul general for the Colombian government in New York City.

Don Kirk, on a year's sabbatical leave from his post as chairman of the electrical engineering department at the Naval Postgraduate School in Monterey, Calif., is now at MIT's Lincoln Laboratory. He writes: It has been enjoyable and educational for my three daughters, Kara, 18, Valerie, 15, and Dana, 13, to learn about New England after having grown up in California."

Peter Peloquin currently serves as glue room supervisor at Seaboard Folding Box Corp., Fitchburg, Mass.

Lee Smith, Jr. is assistant plant manager for du Pont in Ft. Madison, Iowa.

Edwin Tenney continues as manager, mechanical collector market, at GE Environmental Services, Lebanon, Pa.

1960

Paul Johnson is still regional director of the MIT Alumni Association. He has an AB from Colgate University and a master's degree from Boston University. He also attended the Harvard School of Business, from which he holds a certificate.

Raymond Levesque is now employed as plant and manufacturing manager in the Engineered Products Department at American Cyanamid, Havre De Grace, Md.

Robert Norton of the WPI mechanical engineering department attended the Hewlett-Packard Seminar dealing with Dynamic Analysis Equipment in September.

1961

Prof. **Roger Borden** of the WPI mechanical engineering department has received a certificate of advanced professional studies in religion from Assumption College for the ten courses and thesis which he has completed beyond his master's degree in religious studies.

James Fogarty is president of Plastic Engineering Assoc., Inc., Boca Raton, Fla.

Currently, **Brad Hosmer** holds the post of vice president of group services at AMF, White Plains, N.Y. Previously, he was with Branson Sonic Power Company, Booz Allen & Hamilton, and Kodak. Active with the WPI Alumni Association, Brad also has been busy with community affairs, serving as chairman of the Church Council. In 1976 he was elected to the school board in West Redding, Conn. His wife, Nita, has had her own business as a freelance fashion designer since 1967.

Larry Israel's company, Visualtek of Santa Monica, Calif., is the world leader in the electronic reading aid market. His product, an electronic magnifier, is used by the "legally blind." Currently, Visualtek, has over $4,000,000 in annual sales. "It's been nice to have a successful small business, but it's especially nice to simultaneously be able to bring such a blessing to thousands of visually impaired individuals around the world." Among those people are a world-famous trial attorney, a well-known actor, a number of judges, etc. "But the most pleasure comes from helping someone you know."

Asjed Jalil continues as a senior engineer in the rolling mill department at Morgan Construction Co., Worcester. Early in his career, he worked as a sales engineer for ESSO in India. Outside interests include his association with technical societies, community affairs, tennis, and travel. The Jalils, who reside in Holden, have one child, a daughter.

Currently, **G. Leonard Johnson** holds the post of director of generation engineering at Northeast Utilities Service Company in Connecticut. He is responsible for numerous projects on operating nuclear units, coal conversion of several fossil plants currently burning oil, and a few hydroelectric projects. He joined Northeast as a "charter member" in 1966 when the company was formed.

The **James Kachadorians** of Woodstock, Vt. recently returned from a trip to England, France, and Switzerland. While on tour, Jim presented a paper on passive solar energy at the World Solar Forum in Brighton, England. During the forum, representatives from 74 countries met and exchanged ideas and pursued common interests in methods of utilizing solar energy. The trip was highlighted by visits to a family friend in Bath, England, and to relatives in St. Cyr-Lyon, France. Jim's wife, who does all of the advertising for his manufactured passive solar home business, holds the U.S. unofficial record for vertical feet skied in one day by a woman. Last year Jim bagged two bucks in the same season. He also enjoys travel, skiing, camping, fishing, and engaging in community activities.

Wood chopping, hiking, and cross country skiing are favorite pastimes of **Peter Kuniholm**, who, with his wife and children, usually resides in Pound Ridge, N.Y. Currently, he writes: "Enjoying an interesting experience in Egypt working on long range planning and doing a design study for waste-water systems in cities along the Suez Canal. Will be here for 18 months, but we'll be glad to be back in New York next fall." He is with Malcolm Pirnie, Inc., Consulting Environmental Engineers.

Charlie Mello continues as a facilities planner and plant engineer for Coppus Engineering. A resident of Paxton, Mass., he enjoys town politics and youth activities, as well as tennis. He is married to Ann McIntosh (sister to Bob, '62) and has four children. His career has sent him to Rio de Janeiro and Lisbon. "Hope to spend more time in Europe."

For the past 14 years **Dick Miczek** has been with The Fort Miller Co., Inc., a manufacturer of precast concrete products. He is now executive vice president of the firm, which has branched out into commercial and residential fencing products (Anvil Fence & Supply Co.). Activities include vegetable gardening, ice fishing on Lake George, and involvement with church activities. "Have volunteered many years of time in girls' softball, serving on the board of directors, coaching, managing and winning a few trophies to boot."

John Ogorzalek is currently employed as a production manager at Henkel Corp., Hawthorne, Calif. He holds a JD from Western State University and he passed the California bar exam in 1976, although he does not now practice law. Active in support of various handicapped associations, in 1976 he was named Man of the Year for California Communities Pool for the Handicapped.

Yesugey Oktay serves as division head in charge of civil and structural engineering at Boston Edison Company. Also, he teaches structural steel design at Northeastern University. Oktay's wife, Shirley, is a pediatrician associated with Boston University Medical School. They have a four-year old son, David.

Won Park writes from Seoul, Korea, that he enjoys relaxing at his wonderful home in the suburbs with its mountain view. For the past eleven years, he has served as managing and planning director of the Duksung School Foundation. The Foundation, which includes a women's college, a girls' middle and high school, and a kindergarten, recently celebrated its 61st anniversary. Park's wife teaches at the women's college. The couple has a daughter, Elisa, 11. "We also have 15 dogs."

Ken Parker's son, Matt, is a freshman at WPI. After working for U.S. Steel, Gilbane Building Co., and Fletcher-Thompson, Inc., he became a real estate investor-entrepreneur in 1978. "The hours are longer, but I love the freedom." At last count his firm, Monmat Enterprises, Inc, Warwick, R.I., owned or operated 70 apartments, seven offices, two shops, and a laundromat.

Bill Peirce teaches full time at Cape Cod Community College; teaches part time at Northeastern; and serves as director of development for Falmouth Academy, while he and his wife, Marilyn, continue to run a small consulting business on the side. The Peirces and their children enjoy life on Cape Cod. They sail Hobie 16's in national and international competition, as well as lasers, sunfish, and windsurfers. They continue competing in water skiing. (In 1964, Bill and Marilyn won the U.S. National championships in mixed doubles water skiing.)

John Powers continues as assistant chief engineer at Tighe & Bond, Springfield, Mass. He has been responsible for the preliminary planning, final design, and construction supervision of numerous sanitary engineering projects including sewers, pumping stations, and wastewater treatment plants, water distribution and treatment systems. His wife, Julie, has a BA in social work and is a registered nurse.

John Quagliaroli, who founded Fowler, Anthony & Co. in 1976 (mergers, venture capital, etc.) has recently started a second operation to set up national marketing facilities for high-technology startups in return for equity/cash. Previously, he was with IBM, Multitone Electronics, and F.L. Mannix & Co., Inc. He has published over 200 pages of marketing/financial studies and has served on the board of directors of private firms as well as a children's home. He is listed in "Who's Who", as is his wife, an IBM manager and 1980 finalist for a White House Fellowship.

David Raab now works for C.S. Draper Lab., in Cambridge, Mass. He returned to his home in Belmont recently after more than two years assigned as a field engineer at Rockwell in Downey, Calif. Earlier he had taught for two years at Wentworth Institute. One year he backpacked around Europe from the North Cape of Norway to the southern tip of Israel, with an excursion to Leningrad and a ski trip in the Swiss Alps. He writes, "Most of my activities in California centered around the schedule of the Sierra Club."

Still with his wife's family oil business in Maine, **Leo Robichaud** is also busy as a member of the Caribou planning board and as a director for the local Rotary Club. In business he is in charge of all construction and maintenance and manages a branch office. "I enjoy this, because I design all the projects and build them acting as superintendent." From 1961 to 1973, he worked for the USDA's Forest Service.

Sheldon Rothstein practices corporate law with Polaroid Corporation. Early in his career, he was a patent examiner at the U.S. Patent Office. In 1965, he received his JD from Georgetown University. He says, "Lori keeps busy managing the family vineyards in the Rhone Valley and overseeing our homes in Framingham and Antibes." The Rothsteins have three children.

Since joining The Burke Co. seven years ago, **Ned Rowe** has managed sales and distribution organizations, worked in marketing, and is now selling heavy construction equipment. He enjoys travel, and took a six-month trip around the world, later going to Russia and Africa. "I've worked on the ski patrol, and used to be kind of fanatic about skiing, but it gets increasingly difficult to make the time for it." He is located in Oakland, Calif.

Golf, tennis, racketball, and paddle ball are some of the pastimes of **Robert Ruberti**. He and his family also like camping, cross country skiing, and travel. Currently, he is chief of the Command Intelligence Section at Rome Air Development Center, Griffiss AFB, N.Y., where he has worked since graduation. He helps develop intelligence information systems, including the new intelligence component of the Space Defense Center in Colorado and the National Military Intelligence Center at the Pentagon.

John Ryerson has worked at IBM in various staff and management, technical and planning jobs for 20 years. Now headquartered in White Plains, N.Y., he is concerned with marketing requirements. He serves as a deacon and trustee for the Baptist Church in Suffern, N.Y. The family is involved with children's sports.

Bob Schomber serves as T&D manager for the southeastern division of Florida Power & Light, a position controlling 550 employees and a $20 million expense budget. Previously he had been with Fuqua Industries Company and Owens Corning Fiberglas, serving the boating market. He has been active as vice chairman of the school board audit committee. "We live on the water and are all addicted to the fishing, diving, water skiing and camping activities in Florida."

1962

Dr. **Michael Davis** is currently professor of radiology and nuclear medicine at the University of Massachusetts Medical School in Worcester.

Clifford Engstrom has been employed as general manager of the Massena (N.Y.) Electrical Department. He says, "I started Sept. 1st as the first general manager of Massena Electric. Massena is the first new municipal electrical system created in many years. I have to start the business almost from scratch."

Richard Frost holds the position of district superintendent and transmission and distribution at Narragansett Electric Co., Providence, R.I.

Philip Pilibosian was recently named assistant vice president in sales by Pacific Telephone. In his new post, he is responsible for sales activities in the professional services and utilities market in Southern California. He began his Bell System career in 1975 at AT&T in the marketing department. He served as an industry manager and was responsible for accounts in the printing and publishing field. He held several managerial positions at AT&T before joining New England Telephone's marketing department in 1980. Until he assumed his current assignment, he was a division manager for the company's accounts in the health care and lodging segment. He has an MBA from Clark University.

1963

Dr. **Robert Behn** continues as an associate professor at Duke University Institute of Policy Sciences in Durham, N.C.

WPI Prof. **Allen Hoffman** placed second in the Frank Sannella Alumni Race held Oct. 3rd.

Russell Hokanson is a design liaison supervisor at du Pont in Newark, Delaware.

Dr. **Stephen Nagy** has joined the senior professional staff at the Mary Imogene Bassett Hospital, Cooperstown, N.Y., where he is a radiation physicist. His primary responsibility is treatment planning and dosimetry for the Radiation Therapy Department. He also serves as radiation safety officer for the institution. He received his MS and PhD degrees from the University of Connecticut. From 1969 until 1975, he was an assistant professor of physics at the University of Vermont.

1964

Stuart Bowen is the owner-manager of Lenora Restaurant on Massachusetts Avenue in Cambridge, Mass. He holds a BSCE from Northeastern and a PhD from the University of Massachusetts. The Bowens live in Winchester and have two children.

William Cote holds the position of vice president and general manager at TRC-Env. Consultants in Englewood, Colorado.

Harry Fager, Jr. is chief of a management office for the USAF at Tinker AFB in Oklahoma.

Ronald Gemma works as a market development manager at Digital in Merrimack, N.H. He has an MBA from Babson.

J. Richard Lundgren is now an associate professor at the University of Colorado at Denver. He has an MS and PhD from Ohio State University. He and Linda live in Lakewood and have two children.

Dr. **Robert Peura**, coordinator of biomedical engineering at WPI, was the author of a paper presented at Kyoto (Japan) Medical School in August. It was titled: "A Biomedical Engineering Analysis of Impedance Plethysmographic Measurements of the Extremities—The Nature of the Physiological Signal and the Impedance Sampling Field." Currently, Peura is on sabbatical leave until next September. During the academic year he will be at MIT studying under an NSF faculty professional development grant.

Stan Szymanski has been appointed manager of Chlor-Alkali Systems in the newly formed Technology Licensing Department of the Industrial Chemicals Group at Hooker Chemical Company, Niagara Falls, N.Y. The new department will be responsible for technology licensing and acquisition in the Industrial Chemicals Group's major business areas of chlor-alkali, sodium chlorate, and specialty chemicals. Stan will have responsibility for marketing, sales, and technical service for his division. His previous worldwide responsibilities as international business development manager, have taken him to Norway, Tanzania, and Russia, as well as other countries. In addition, he has accepted an assignment to act as special liaison for Occidental Petroleum, Hooker's parent organization in Poland and Hungary.

1965

▶*Married:* **James F. Fee** to Joan Frelich in St. Louis, Missouri on August 16, 1981. The bride has a BA from Skidmore College and a master's degree from Boston University. She works as a therapist at Beaverbrook Child Guidance Center in Waltham, Mass. Her husband continues as a product manager at Accutest in Chelmsford, Mass.

Marvin Berger has joined the management consulting group of Bigelow & Company, Manchester, N.H. He previously had been with several major corporations, including IBM, where he held sales, marketing, and management positions. He has an MBA from Amos Tuck School at Dartmouth.

Denis Berube holds the post of manager of advanced engineering at GE in Binghamton, N.Y. He has an MSEE from Union College.

Michael Boyd continues as a senior programmer at Sperry Univac in Roseville, Minnesota. He holds both his master's and doctor's degrees from the State University of New York at Binghamton.

Tolga Cubukcu works as a structural engineer for the Pyramid Companies in Dewitt, New York.

George Mitschang, a commander with the U.S. Navy, is currently located in Washington, D.C. He holds an MS from Cornell and a PhD from the Naval Postgraduate School.

Gerald Morris, vice president, treasurer, and chief financial officer of the Foxboro (Mass.) Company, was recently elected to the Boston chapter of the Financial Executive Institute. The Institute is a professional organization of over 12,000 executives representing more than 6,000 firms in the U.S. and Canada. Morris has a degree from Harvard Business School. Before joining Foxboro, he was assistant vice president of the Textron Corp.

Burton Shair is involved with project management at Stone & Webster, Houston, Texas. He is a registered professional engineer in Massachusetts, Connecticut, New York, Texas, and Alaska.

1966

Walter Chang is employed as manager for Far East Market Development at AEG, General Electric Co., Lynn, Mass.

Alan George holds the position of division training manager at Teradyne, Inc., Northbrook, Illinois.

Keith Knowlton serves as vice president of Fiberoptics Technology in Pomfret, Conn. He helped found the company and is also a partner.

Jan Moren, who returned from Belgium in November of 1980, is now at Fort Monmouth in New Jersey. His wife, Ann, is a physical therapist at Monmouth Rehabilitation Hospital.

Laurence Shea holds the position of superintendent of engineering for Stone & Webster at Nine Mile Pt. 2 Nuclear Power Station, Lycoming, New York. He has an MBA from Northeastern.

Robert Zahnke holds the post of manager of engineering development at Pepsico, Inc., White Plains, N.Y.

1967

▶*Married:* **Joseph R. Pyzik** and Mary E. Cahillane in Northampton, Massachusetts on August 1, 1981. Mrs. Pyzik graduated from Elms College and received a master's degree in education of the deaf from Smith College. She is employed by the Capital Region Education Council for the Hearing Impaired in Wethersfield, Conn. Her husband has a master's degree in business administration from the University of Hartford. He is an engineering account executive for The Travelers Insurance Company.

Ron Gordon works as a product strategy and planning engineer for IBM. Currently he is holding a temporary position with the company in Germany.

Charlie Proctor continues as president of The Ski and Scuba Shoppe, a retail business specializing in instruction, sales, repairs of scuba and cross country ski equipment. Recently he was promoted to program manager of all T53/T55 commercial aviation and marine turbines for AVCO Lycoming. Previously he was in charge of production engineering support. He has completed his MBA at the University of Bridgeport and is now enrolled in the JD of law program. In his spare time, he enjoys diving, fishing, and hunting with his Labrador retriever. "Of course I'm still building high performance vehicles. The latest is a 1954 military jeep with a fuel-injected Chevy 350 and the usual line-up of goods."

Deputy District Attorney **Howard Shore** has been named the first prosecutor to head the California State Bar's 15-member commission on correction. An expert in psychiatric issues in criminal trials, he has said the reported link between nutrition and violent behavior will draw top priority for examination by the commission in the upcoming year. He says, ". . . our goal is to help reduce violence in state prisons through changes in prison diet." Previously, Shore had been on the panel for the last three years, last year serving as vice chairman. The commission is charged with examining issues concerning jails and prisons, and making recommendations to the state Bar and its legislative representative.

Shore has been with the DA's office since 1974. Also, he is a professor in the University of San Diego's graduate law program, teaching classes in scientific evidence and advanced evidence.

Charles Sisitsky has been named the permanent planning director of Natick, Mass. Previously, he was a city planner in Medford for eleven years, and had served as assistant planning director, planning director, and community development coordinator. He has a master's degree in planning from the University of Rhode Island.

John Yang is a senior engineer at Lockheed Electronics Co. in Plainfield, N.J.

1968

▶*Married:* Dr. **John J. Hudak** and Ann C. Lennardtz in Worcester on October 24, 1981. The bride, a reference librarian at the Worcester Public Library, has a BS degree from the University of Minnesota, as well as a master's degree in library science. Her husband is a physicist with the Department of Defense in Washington, D.C. He has a doctorate degree in solid state physics from the University of Maryland.

▶*Born:* to Betty and **Bob Meader** a daughter, Rebecca, on August 28, 1981. Bob, a civil engineer (study manager) with the U.S. Army Corps of Engineers, has returned to Mobile, Alabama following a year of special training in Washington, D.C.

Ivan Beggs has been promoted to assistant general supervisor of cup and cone grinding at the Timken Company's Canton, Ohio bearing plant. He holds master's degrees in both industrial engineering and business administration from Ohio State University. In 1979, he joined Timken as a manufacturing analyst in bearing operations, the position he held prior to his recent promotion.

Robert Hickey holds the post of principal software engineer at Honeywell in Denver, Colo.

Ali Koseatac is now the principal engineer at International Engineering Co., Inc., Darien, Conn.

Cary Palulis was the winner of the Frank Sannella Alumni Race held at WPI in October.

Frank Posselt works for TAD Tech in Cynwyd, Pa.

Raymond Racine serves as assistant coordinator in the alternate energy department at Texaco, Inc. in White Plains, N.Y.

Scott Ramsay is now a merchandising manager for Shaw's Supermarkets, Inc. in Newington, N.H.

Geoffrey Tamulonis holds the post of manager of applications marketing at Digital Communications Corp., Germantown, Md. He is working for his MBA at George Washington University.

Bruce Tupper is currently a resident in the department of surgery at the University of Florida in Gainesville. He holds an MSEE from Stanford University. He has just received his MD from Rutgers Medical School.

Stan Urbanowski works as a senior engineer at Yankee Atomic Electric Co., Framingham, Mass. He and Claire have three children and live in Sutton.

1969

Warren Anderson was recently promoted to major in the USAF and transferred to Hickam AFB in Hawaii. Previously, he was a pilot instructor for the C-5 Galaxy, the world's largest aircraft.

Francis Archambeault has been named associate professor of electronic engineering at Central New England College, Worcester. He has been with the college for eight years.

James Atkinson is assistant director of legislation in the Office of Policy Analysis at the New Jersey Department of Transportation in Trenton. He has a Juris Doctor degree.

Ralph Eschborn II works as a senior sales representative at du Pont in San Francisco. In 1980, he received his LLD from Delaware Law School. He and Ellen have one child and reside in Laguna Hills.

Arthur Evans has been appointed project manager for Arabian American Oil Co. (Aramco), of Goulds Pumps, Inc., Seneca Falls, N.Y. He will be responsible for the preparation of all proposals to Aramco, as well as acting as the coordinator of the worldwide sales efforts to this account.

Doug George and his father, **George George, '41**, have taken over the management of the "9-20" Motel in Northboro, along with the West Boylston Motel and other properties in eastern Massachusetts. "We have completed a total rehab of all the '9-20' rooms, function space and restaurant," Doug says. Their construction business has slowed, but is still doing well "despite the economy." The Georges, who have a daughter, Jamie Lynne, 3, are active with the Congregational Church.

Dr. **Roy Johnson** is employed as an associate engineer at Mobil Research & Development Corp., Dallas, Texas. Formerly, he was associate professor of civil engineering at Auburn University in Alabama.

Dennis Murphy serves as a system engineer for ESL, Sunnyvale, Calif.

1970

►*Married:* **Daniel B. Bentley** to Daria B. Eckle in Guilford, Connecticut on September 17, 1981. The bride graduated from Sacred Heart University, Bridgeport. The bridegroom is employed as a field engineer for the Riley Stoker Corporation.

Last year **William Coblenz** received his PhD in ceramics from MIT, where he received his master's degree in 1977. He has taken a job as a ceramic engineer with the Naval Research Laboratory in Washington, D.C.

James Ford was recently promoted to associate actuary within the pension actuarial organization at State Mutual Life Assurance Company of America, Worcester. He earned an MS in actuarial science degree from Northeastern in 1973. In 1977, he received the fellow, Society of Actuaries professional designation. After joining State Mutual as an actuarial assistant in 1970, he became an actuarial associate in 1972. In 1975, he was named senior actuarial associate and was promoted to assistant actuary in 1977.

T.J. Lelek holds the post of national sales manager for Gill & Duffus Chemicals, New York City.

Cyril Musson is a mechanical process engineer at R.M. Parsons Co., Pasadena, Calif.

Chet Napikoski works as an electrical engineer for Arizona Public Service, Phoenix.

Craig Olmsted has been appointed director of engineering at Cutler Associates, Inc., Worcester. Previously, he worked for Chas. T. Main, Inc. and Stone and Webster Engineering Corp. A registered professional engineer in Massachusetts, he holds both a bachelor's and master's degree from WPI.

Currently, **Lenny Polizzotto** holds the post of director of research and development at Briox Technologies, Inc., Worcester.

Laurence Vallee is employed as a project manager at Cygna Energy Services in Boston. He says, "Am presently managing Cygna's site office at the Midland nuclear power station, Midland, Michigan."

Hans Van Den Biggelaar, who holds a PhD from WPI, was recently named a professor of computer science at St. Anselm College, Manchester, N.H. Previously, he was a member of the faculty at Southeastern Massachusetts University, Skidmore College, and RPI.

Ross Weaver continues as president of Gurney Engineering Corp., Millbury, Mass. He writes, "New house under construction."

1971

►*Married:* **Thomas F. Mirarchi** to Ellen T. Murley in Worcester on July 18, 1981. Mrs. Mirarchi graduated from the University of Massachusetts, Amherst, and received her master's degree from Worcester State College. She is an assistant education supervisor of the Head Start Program in Worcester. The bridegroom, who has a master's degree from RPI, is a senior development engineer at American Optical Corp., Southbridge, Mass.

►*Born:* to Beverly and **Paul Ash** a daughter, Dawn Marisa, on September 17, 1981. . . . to Annie and **Donald Usher** their third child, Cory Denis, on November 13, 1981. Don is now a regional representative for Babcock & Wilcox in Houston, Texas.

Recently, **William Beloff** was promoted to the position of associate at Goldberg-Zoino & Associates, Inc., a geotechnical and geohydrological consulting engineering firm in Newton Upper Falls, Mass. Since joining the firm in 1973, he has been involved in a variety of geotechnical instrumentation programs for rapid transit systems, underground powerhouses, nuclear power plants, and deep foundations. He has worked in 26 states and in Panama, Colombia, Venezuela, and Paraguay. As associate, he will be in charge of all the firm's work, which includes a study of ground subsidence over a full extraction coal mine in West Virginia. He will also continue in his capacity as chief engineer. A registered professional engineer in Massachusetts, he belongs to numerous professional societies and has published several papers in the field of geotechnical instrumentation.

Paul Cleary, who graduated from the University of Tulsa Law School last May, was sworn in as a member of the Oklahoma bar in October, however, he is not practicing law. Previously the political editor of the *Tulsa World*, he was recently named as an editorial writer at the newspaper. He joined the "World" as a part-time reporter while attending the University of Tulsa, later becoming a full-time reporter and political editor. His wife graduated from the University of Missouri Journalism School and "covers the courthouse beat for the paper."

Paul Furcinitti serves as a research associate in biophysics for Columbia University, Radiological Research Accelerator Facility/Brookhaven National Laboratories, Upton, New York. He has an MS and PhD in physics from the University of New Hampshire.

Jack Greenshields holds the post of division purchasing manager at Monsanto in St. Louis, Mo. He has an MBA from the University of New Haven.

Dr. **Amrik Pabley** is an ophthalmology resident at U.C. Davis Center, Sacramento, Calif. He received his MD from the University of Louisville in Kentucky in 1980.

Thomas Pandolfi works as a development engineer at Hewlett-Packard in Palo Alto, Calif.

John Petrillo participated in the placement seminar held at WPI in November. He is district market manager for AT&T Long Lines.

Paul Popinchalk, who just returned from Nebraska, is now a mechanical designer for Dubin-Bloome Asso., West Hartford, Conn. He and his wife, **Nancy Wood Popinchalk, '73**, live with their two children in Norwich.

Edward Sherman has been promoted to product manager of Lighting Products at American Sterilizer Company (AMSCO), Erie, Pa. His product responsibilities include AMSCO's surgical lighting product line, audiovisual systems, and AMSCOPE support columns. He joined AMSCO Systems Division in 1974 as a field superintendent and subsequently served as manager of special projects and product manager of building systems. His most recent position was that of assistant product manager, Sterilizer Products Department. He has an MBA from Gannon University.

Thomas Weil is employed as a project engineer at Badger America, Inc., Cambridge, Mass. He has an MBA from the University of Houston and an MS from UMass.

1972

►*Married:* Dr. **Roy Lindblad** and Mary-Margaret Bayko of Garfield Heights, Ohio on September 19, 1981. The groom is a dentist in Cleveland. In 1980 he received his DDS from Case Western Reserve University. . . . **Bradshaw B. Lupton, Jr.** to Paula S. Jakubiak in Shrewsbury, Massachusetts on June 12, 1981. The bride graduated from Quinsigamond College and UMass, Amherst. She is conservator of works of art on paper for the Yale University Art Gallery and Yale Center for British Art, New Haven, Conn. Her husband serves as a software analyst for Honeywell Information Systems, Billerica, Mass.

David Cummings has been elected executive vice president of the Lowell Corporation, Worcester. He is a fifth generation family member of the firm's founder. In 1977 he joined Lowell and has been serving as treasurer and director. He has a master's degree in business administration from Babson College.

Jean Fraser continues as a senior planner for Land Use Consultants in London, England.

William Kamb is a job superintendent at Turner Construction in Cleveland, Ohio.

David Meyer is now employed as a senior consultant for Rath & Strong, Inc., Lexington, Mass.

George Oliver works as a senior engineer at Exxon in Florham Park, N.J.

Wesley Pierson is employed as a clinical research associate at du Pont - Biochemicals in Wilmington, Delaware.

Brian Savilonis of the WPI ME department took third place in the Frank Sannella Alumni Race at WPI in October.

1973

►*Married:* **Thomas P. Cawley** and Maureen I. Sullivan in Dorchester, Massachusetts on September 26, 1981. Mrs. Cawley is a teacher and holds a master's degree in education from Boston State. The groom continues with Stone & Webster of Boston. . . . **Philip N. Ciarlo** and Lisa B. Plonski in Erie, Pennsylvania on September 4, 1981. Mrs. Ciarlo is a student at Gannon College in Pennsylvania. The bridegroom is a manager of materials at GE in Erie. . . . **John F. Cirioni** and Diana E. Cather in Massachusetts recently. The bride graduated from Leicester Junior College and Northeast Missouri State University. She is director of recreation for the City of Pompano Beach, Florida. Her husband serves as a supervisor for Cumberland Farms Stores in Pompano Beach. . . . **John F. DiGregorio** to June A. Soldato on October 24, 1981 in Pittsfield, Massachusetts. The bride attended Berkshire Community College. The groom is a supervisor of Pittsfield projects at GE plastics technology department. Besides WPI, he attended the University of Evansville in Indiana and Union College.

►*Married:* **Timothy Jurzynski** to Kathleen Franzis in Seymour, Connecticut on November 7, 1981. Mrs. Jurzynski graduated from New Haven Academy of Business and is a secretary for Naugatuck Glass Co. Her husband, who has an MBA from the University of Bridgeport, is an operations analyst for Naugatuck Glass. . . . **Kenneth Lexier** and Sue D. Jordan in Attleboro, Massachusetts on September 5, 1981. The bride graduated from the University of Maine and was a teacher in Attleboro. The groom began his new post as principal of Wells Elementary School in Maine last July. . . . **Warren F. Smith** to Jill Carpenter on August 8, 1981 in Teaneck, New Jersey. The bride graduated from Duquesne University and has a master of social work degree from Rutgers. She is employed by the Continental Insurance Company as a computer programmer. Her husband has an MS in management science and engineering from WPI. He is a senior engineer with Air Cruisers Company. . . . **Francis J. Yopak** and Mary Ellen Reed on June 27, 1981 in Massachusetts. The bride graduated from St. Anselm's College and is a graduate student in nursing at the University of Connecticut. The groom works for United Technologies Research Center in East Hartford, Conn.

►*Born:* to **Stephen** and **Deborah Laplante Goodwin** a son, Matthew, on August 4, 1981. Beth is 5 and Andrew is nearly 3. Steve is still employed as a project engineer at J.E. Sirrine. The family is busy at home, at church, and with other activities. . . . to JoAnn and **Richard Silvestris** a son, Jeffrey Robert, on August 27, 1981. Jeffrey has an older sister, Julie Marie. Silvestris holds the post of production engineer in the Chemical Division at Polaroid in Waltham, Mass.

Thomas Beckman continues as a structural engineer for Gilbert Associates of Reading, Pa. He and Donna have two children and reside in Richland, Washington.

Nora Blum is a senior engineer at Bechtel Power Corp., Norwalk, Calif.

David Cirka is currently on leave from his post with Public Service Co. of New Hampshire, while working on his master's degree at RPI.

Rick Garagliano is a senior process engineer at Thiokol/Dynachem in Tustin, Calif.

Glen Johnson is an associate professor at Vanderbilt University, Nashville, Tenn. He has an MSME from Georgia Tech and a PhD from Vanderbilt.

Joel Loitherstein serves as a project engineer at Coffin & Richardson, Inc., Boston.

Last May, **Stephen Martin** graduated from the University of Rochester School of Medicine and Dentistry. He received his MD and his PhD in biochemistry, and was elected to Alpha Omega Alpha, a medical honor society. His PhD work has been published in *Biochimica et Biophysica Acta*. Currently, Steve is doing an internship in internal medicine at Rochester General Hospital. He will begin a residency in ophthalmology at the university's Strong Memorial Hospital in July. His wife, Cheryl, is teaching in a gifted program for grades 3-6 in a Rochester suburb.

Dr. **Bill Penney**, assistant professor of biomedical engineering at WPI, was co-author of "An Overview of the Theory and Some Applications of Impedance Plethysmography," which was presented at the 3rd Annual Conference of IEEE Engineering in Medicine and Biology Society, Frontiers of Engineering in Health Care, in Houston last September.

Michael Peterson is a consumer services engineer at Massachusetts Electric Co., Leominster, Mass.

William Rutherford serves as a construction engineer for Stone and Webster in Shippingsport, Pa. at the Beaver Valley nuclear site.

Charles Scopelitis was recently promoted to computer operations supervisor at Northeast Utilities (NU), Millstone Station. In 1974, he joined NU as assistant engineer at Millstone. Later he was promoted to associate engineer and engineer. He is a registered professional engineer in Connecticut and a licensed electrical contractor. He belongs to the IEEE and NU's Nuclear Speakers Bureau. In the community, Scopelitis serves as secretary of the Mohegan Volunteer Fire Company and is a past member of the Montville (CT) Board of Education. He coordinates internship programs at Millstone for local high school students who are interested in engineering careers, and coordinates and teaches educational programs for junior and senior high school students.

Robert Sykes is a project engineer at Foster-Miller Associates, Inc., Waltham, Mass

1974

►*Born:* to Anne and **Christopher Cigal** their first child, Stephen Matthew, on May 19, 1981. Chris, an Army captain, has been an assistant professor of military science at Washington & Jefferson College in Washington, Pa., since 1979.

Garry Balboni took part in the fall placement seminar held at WPI. He is project manager at Perini Corp., Framingham, Mass.

Erik Brodin now holds the post of senior industrial engineer in the assembly division at General Motors in Warren, Michigan. The Brodins have a daughter, Christina, 2.

Paul Colby is a research assistant in the physics department at the University of Wisconsin in Madison.

Richard Corey, who recently came out with a successful system for achieving high postal exam scores, is now writing a consumer-oriented book about security alarm systems. (He has his own security alarm business.) For five years he's been working on a police projectile gun to disable the electrical system of any vehicle being pursued by authorities. Doc" thinks he's close to having it perfected and ready for marketing.

Last fall, **Steve Dacri** performed at the Magic Castle in Hollywood; at Maxine's in Worcester; and with Red Buttons in Anaheim, Calif.

Mathew DiPilato has been appointed as district manager at Goldberg-Zoino & Associates, Inc., a geotechnical-geohydrological consulting firm in Newton Upper Falls, Mass. Since joining the firm in 1977, he has been associated with deep and shallow foundations projects, slope stability and protection problems, seepage, dewatering, and groundwater control projects. He was responsible for the geotechnical aspects of design and construction of the surface and cut-and-cover sections of the Buffalo Light Rail Rapid Transit Project. He was the principal author for a recently completed research report for the U.S. Department of Transportation, entitled "Design and Analysis for Railroad Track Substructures." A member of the ASCE, he also belongs to the Boston Society of Civil Engineers, and the National Water Well Association. He is a registered professional engineer in Massachusetts.

Joe Downey serves as a product marketing specialist at Foxboro Analytical in Plymouth, Mass.

Bob Foley now holds the post of manufacturing supervisor at Texas Instruments in Attleboro, Mass. He recently left the U.S. Marine Corps following seven years of service.

Bill Frazier is a design engineer for Virginia Electric & Power Co. in Richmond, Va.

Thomas Frink continues as an electrical engineer at Malden Mills, Inc., Lawrence, Mass.

James Grenier is currently a math teacher at Sunapee (N.H.) High School. He holds an MS in mathematics from WPI.

Leon Kassel holds the post of senior vice president at Multibanco Comermex in Mexico City.

Bruce Lyon serves as an analyst for Schlumberger in Houston, Texas.

David McGuigan continues as a member of the technical staff at Bell Telephone Labs in Holmdel, N.J.

David Nickless was recently admitted to the Massachusetts bar, after receiving his Juris Doctor degree from Suffolk University School of Law. Previously, he spent nearly five years in the U.S. Army from which he resigned as a captain. Currently, he is a member of the firm of Marullo and Barnes in Boston.

Mark Ostergren is an engineering coordinator at Babcock & Wilcox, North Canton, Ohio.

Stanley Purington is an engineer-programmer at Kentron International in San Diego, Calif.

Lawrence Saint, Jr. holds the position of plant manager for George Schmitt & Co., Suffolk, Va.

Glenn Yee is commercial manager for the Asia-Pacific region of Continental Can International Corp., a wholly-owned subsidiary of Continental Group, Inc. He is located in Hong Kong as an expatriate on an overseas assignment.

1975

►*Married:* **Allen G. Downs** and Donna M. Mericnyak on August 29, 1981 in Huntington, Connecticut. Mrs. Downs attended the University of New Haven, West Haven. The groom is a student at Harvard Business School. He has a master's degree in chemical engineering from the University of Pennsylvania.

Kent Berwick holds the post of manager of customer service at Aviation Simulation Technology, Bedford, Mass. He is also a C-130 pilot and lieutenant in the USAF Reserve.

Richard Bloom was recently elected president of Independent Glass Company of Rhode Island, Inc. With the firm for seven years, he has been vice president for the last four. Also, he is president of Auto Security Systems of Rhode Island and a general partner in Independent Realty Company. Independent Glass is located in Providence.

Louis Christoforo works for Tech HiFi in Randolph, Mass.

Bradford Esten is an actuarial associate at Transamerica-Occidental, Los Angeles, Calif.

Henry Fitzgerald holds the position of program manager at Data Packaging Corp., Cambridge, Mass., for the consumer and medical divisions.

David Giddings serves as a research chemist at Ferro Corp./Technical Center in Bedford, Ohio. He will soon receive his PhD from Brandeis.

Steven Harvey is a first-year MBA student at the Wharton School at the University of Pennsylvania.

Robert Hickey is a program analyst at GE in Springfield, Va.

Louis Isgur serves as a senior manufacturing engineer at McDonnell Douglas Corp. Astronautics Co., Huntington Beach, Calif. He has an MBA from Suffolk University Graduate School of Business.

Gary Kiontke has been elected assistant actuary at Monarch Life Insurance Co., Springfield, Mass. He joined the actuarial department in 1977. Previously, he was senior actuarial assistant. Recently named a fellow of the Society of Actuaries, he is also a member of the American Academy of Actuaries. He attended the University of Connecticut's School of Insurance.

Stephen Murphy is employed as a systems engineer at GTE in Needham, Mass.

Peter Schwartz holds the position of director of marketing at MFE Corp. in Salem, N.H.

Margaret St. John continues as a research assistant at the University of Nebraska Medical School. She is doing research in cancer.

Paul Varadian, who has a degree in construction management from WPI, is working with a partner and several investors (North High Associates) in Worcester converting the former North High School into condominium units. Renovations were scheduled to start in late November with a ten-month construction schedule planned. When complete, Varadian says that the $5.6 million renovation project will yield 54 luxury condominiums selling from $90,000 to $190,000 each. The showpiece unit will be the one that includes the tower of the old building, which will boast 18-ft. ceilings. The development will be called North High Gardens.

David Williams works as a transportation planner for the city and county of Denver, Colorado. He has been with the Denver planning office since last March.

1976

►*Married:* **Mark P. Barry** to Michelle NeJaime recently in Goshen, Connecticut. The bride graduated from Becker and is employed at Formley and Martin in Boston. The bridegroom currently attends Northeastern University. . . . **Robert R. Cormier** and Donna M. Larose in Nashua, New Hampshire on September 19, 1981. The bride, a graduate of Nashua High School, is employed as a sales correspondent by Nashua Corp. Her husband is a civil engineer at Allan H. Swanson, Inc. . . . **Kevin B. Hastings** to Kathleen Kelly in Princeton, Massachusetts on August 23, 1981. Mrs. Hastings graduated from Assumption College and is a nursing student at St. Francis School of Nursing, Hartford, Conn. The bridegroom, a student at Hartford Graduate Center of RPI in Groton, Conn., serves as a contracts administrator at Northeast Utilities Service Co., Waterford.

►*Married:* **Joseph T. Martowski** to Dawn M. Baird recently in Gilbertville, Massachusetts. Mrs. Martowski attended Simons Rock College and graduated with a BA in psychology from North Adams State College. She was employed by Valley Human Services in Ware as a caseworker, and is currently a representative of the Mutual of Omaha Insurance Co. Her husband is a quality control engineer for GE in Pittsfield, Mass. . . . **James A. Morocco** and JoAnn Berthiaume on June 6, 1981 in Worcester. Mrs. Morocco graduated from the former St. Peter's Central Catholic High School and is employed in the accounting department of Home Federal Savings & Loan Association. Her husband is a civil engineer with the U.S. Army Corps of Engineers in Waltham, Mass. . . . **Michael P. Petrishen** and Debora M. Abraham in Salem, Massachusetts on September 12, 1981. Mrs. Petrishen graduated from North Shore Community College. She is lead singer in "Portraits in Sound," a general business band. The bridegroom is a computer programmer at Massachusetts Mutual Life Insurance Company and is also a sax player for the same band. . . . **William B. Wood** to **Elizabeth A. Hanlon, '78** on June 6, 1981 in Worcester. The bride is with the research and development department at Sylvania Corp., Needham, Mass. The groom works as a civil engineer at J.M. Cashman Co., Weymouth.

William Baker, a major in the U.S. Army, is currently assigned as a full-time student in the master's program at Florida Institute of Technology, Ft. Lee branch.

Charles Bellemer is employed as a chemical process engineer at Multiwire, Nashua, N.H.

Noreen Borys serves as a senior project engineer for Exxon USA in Los Angeles, Calif.

William Burke is currently employed at the Lahey Clinic Foundation Department of Neurosurgery in Burlington, Mass. He holds a BS as a physician's associate from the George Washington University School of Medicine and Health Sciences, Washington, D.C.

John Casey works as a general foreman at Electric Boat/General Dynamics in Groton, Conn. Last year he received his MBA from RPI.

Mark Coulson is a staff engineer at PSNH, Seabrook Station, Seabrook, N.H.

David DeMeo is a first-year student at Wharton Graduate School of Business, University of Pennsylvania, Philadelphia, Pa.

Richard Enos is an associate planner for Brevard County, Fla., Merritt Island. He and Marsha live in Cocoa.

Bruce Lamarre works as a project engineer at Roy F. Weston, Inc., Concord, N.H. He and Julie have three children and reside in Boscawen.

Wayne Lundblad is employed as manager of engineering at R.D. Brew Co., Inc., Conord, N.H.

Thomas McAloon is now a senior sanitary engineer at the New Hampshire Water Supply and Pollution Control Commission. He is actively involved in ballet and theatre, the most recent production being "Gypsy" with the Concord Community Players.

William Mullen is a hydraulic engineer for the U.S. Geological Survey, Lakewood, Colorado.

Dr. **Earl Myers** is president and founder of Precision Materials, Inc., Rochester, N.Y. The firm was incorporated on May 19, 1981. It deals with laser systems for use in heat treating, cutting, drilling, welding, alloying, cladding, and similar types of materials processing activities. Currently, it is in the process of purchasing a $1.5 million laser system, and it expects to spend around three million dollars more on equipment in the next few months. The company employs engineers, manufacturing people, and tech-

nicians. It plans to have about 130 people on the payroll with a 12 to 15 million dollar gross business within the next year.

Raymond Robey serves as a senior research engineer at Air Products and Chemicals in Allentown, Pa. He leads a technical program in supercritical fluids extraction technology at the company.

James Russo is a project manager at Charles Jewett Corp., Glastonbury, Conn.

Dr. **David Sawyer** works as a senior research engineer in the Solar Energy Division at Chevron Research Co., Richmond, Calif.

Steven Schoen is employed as assistant group actuary at Sun Life of Canada in Wellesley Hills, Mass. After becoming a fellow of the Society of Actuaries in 1980, he was promoted to his present post in February of 1981.

James Sieminski is a computer systems consultant for Computec in Simi Valley, Calif.

Paula Stratouly holds the post of associate mechanical engineer at Fluor Engineers & Constructors, Houston, Texas.

Kevin Wall is now a student at Yale University. He has a master's degree from RPI.

Edward Wright serves as a research engineer for Caterpillar Tractor Co. in Peoria, Ill.

Yinmin Yang is currently a graduate student at Carnegie-Mellon University, Pittsburgh, Pa., where he is working for his PhD.

1977

►*Married:* **William L. Collier** to Janice E. Caminiti in Portland, Maine on October 10, 1981. The bride graduated from Deering High School and works for Bar Harbor Airlines. Her husband is employed at Collier's Nursing Home, Ellsworth. . . . **Paul D. Curdo** and Joy M. House in Westford, Massachusetts. Mrs. Curdo graduated from Burbank Hospital School of Nursing, Fitchburg and is an RN at Kaiser Permanente, San Diego, Calif. Her husband is a structural engineer with General Dynamics, San Diego. . . . **David Kinder** and **Cynthia Bouvier, '78** in Webster, Massachusetts on August 30, 1981. The bride was formerly with the North Carolina Department of Transportation. The groom, who had been with Data General, is now a senior applications engineer for Intel Corp., Alhoa, Oregon. . . . **Ralph Sacco** to Carol Bliss in Cranston, Rhode Island on September 20, 1981. Mrs. Sacco graduated from Rhode Island Junior College and is employed by Co-Op Tech. Her husband is with Westinghouse of Framingham. . . . **Michael L. Wagner** and Eileen B. Brill in Burlington, Vermont on September 12, 1981. The bride attended Edinburgh University in Scotland and graduated from Cornell University. She is a free-lance writer. The groom is a development engineer at Honeywell Electro-Optics Center, Lexington, Mass.

►*Born:* to Claire and **Albert DeFusco** a son on April 24, 1981 in Burlington, Vermont. DeFusco, who received his PhD in chemistry from the University of Vermont last June, has received a National Research Council post-doctoral award at the China Lake Naval Weapons Center, China Lake, California.

John Albernaz is an R&D engineer for GTE Sylvania, Waltham, Mass., and is currently working on site at Kwajalein in the Marshall Islands.

Fred Baker has been promoted to CRT design engineer at Tektronix, Inc. His job involves developing low cost manufacturing methods for portable oscilloscope tubes. Also, he is pursing an MS degree in applied physics at the Oregon Graduate Center. "In my spare time, I am raising sunflowers and ducks."

David Bolin is a senior scientist at Hoffmann-LaRoche, Nutley, N.J. He recently received his PhD from MIT.

Leonard Clow is a freshman student doctor at the New England College of Osteopathic Medicine in Biddeford, Maine. Previously, he received a master's degree in biochemistry from Kansas State University, Manhattan, Kansas.

Stephen Coleman was recently promoted to senior actuarial associate within the group pension actuarial organization at State Mutual in Worcester. Following his graduation from WPI, he began work at State Mutual as an actuarial assistant. In 1978 he was promoted to actuarial associate.

Bill Cunningham, **Ron Howard**, and **Henry LeBlanc** participated in the placement seminar held on campus in November. Bill is at Amos Tuck School, Dartmouth. Ron is president of Datability Software Systems, New York City, and Henry is project manager at Mobil Oil's Chemical Division in Macedon, New York.

Asta Dabrila is now a naval architect at Portsmouth (N.H.) Naval Shipyard.

Kurt Eisenman serves as a product sales manager at Parker Hannifin in Metamora, Ohio.

William Farrell, Jr. is with Exxon Co. USA in Houston, Texas.

Subash Ganguli works as a program manager at PS Ltd. in Fairfield, N.J.

Stephen Golden is employed as a director at Highland Imports, Inc., Marlboro, Mass.

Capt. **Michael Gregory** has graduated with honors from U.S. Air Force pilot training and has been awarded his silver wings at Holloman AFB, New Mexico. He will now fly the F-15 at Holloman.

John Nyquist continues with Procter & Gamble in Cincinnati. He holds a master's degree in chemical engineering from the University of Michigan.

Judith O'Brien serves as a coordinator of electronic controls at GE in Columbia, Md.

Ron O'Connor works as a research assistant at St. Vincent Hospital, Worcester. Last May he received his master of public health degree from the University of Michigan.

Mark Puputti continues as a production engineer at Polaroid Corp., Waltham, Mass.

H. P. Ruefenacht is assistant vice president at SGI, Consulting Engineers, Geneva, Switzerland.

Edward Smith works as a senior project engineer at Astra Pharmaceutical Products, Inc., Worcester.

Theodore Tamburro works as a systems engineer at IBM in Waltham, Mass. Last year he received his MS from American University in Washington, D.C.

Mike Thorogood, who was married last April, is currently a research engineer (R&D) at National Steel Corp. in Weirton, West Virginia. He recently completed a three-year tour as an Army officer.

Linda Weiss is currently in the PhD program at the University of Illinois with a research assistantship through the Illinois State Water Survey.

John Zimmerman works at the Marine Sciences Research Center at SUNY, Stony Brook, N.Y.

1978

►*Married:* **Kevin S. Ingle** and Sandra L. Pisarski in Worcester on August 8, 1981. Mrs. Ingle graduated from Becker and Worcester State College. She is a sales secretary at Commonwealth Gas Co., Southboro, Mass. The bridegroom serves as a financial and electronic-data-processing analyst at Jamesbury Corp. He has just completed his MBA at Babson College. . . . **Steven McLafferty** and Leslie Anderson in Northampton, Massachusetts on September 12, 1981. The bride, who holds a BA in Spanish and English from the University of New Hampshire, is a marketing specialist for major accounts at Wang Laboratories, Inc., Lowell, Mass. Her husband holds the post of electrical design engineer at CSPI in Billerica. . . . **Paul A. Peterson** to Mary Ann Keefe in Worcester on June 20, 1981. Mrs. Peterson graduated from Assumption College and is a day-care teacher at the Living and Learning School. The groom serves as a chemical engineer at American Hoechst Corp., Leominster. . . . **Reginald Roome II** and Susan J. Santora on September 12, 1981 in North Grafton, Massachusetts. The bride, a graduate of the Memorial Hospital School of Nursing, Worcester, is a student at Worcester State College. She was an RN at Memorial Hospital. Her husband serves as a structural engineer at LeMesseurier Associates, Cambridge. . . . **David Tate** and Linda Fisk on September 19, 1981 in Amherst, New Hampshire. The bride graduated from the University of New Hampshire and from Framingham State, where last year she received her MS in nutrition. She is employed at the Manchester Veterans Administration Medical Center. The groom works as a senior software engineer at Sanders Associates, Nashua, N.H.

William Alexander continues as a project engineer at Cincinnati-Milacron, Heald Division, Worcester.

Michael Almeida is an engineer-estimator at Perini Corp., Framingham, Mass.

Paul Avakian is now senior product marketing engineer for NEC Electronics U.S.A., Inc., in the Microcomputer Division in Natick, Mass.

Michael Beaudoin is a student at Purdue University, West Lafayette, Ind. He has taken a leave of absence from Golden Assoc. in Atlanta, Ga. to pursue his master's degree in civil engineering.

Ralph Castriotta is a student at the Medical University of South Carolina in Charleston.

Mae Wright Dameron is the new Energy Roundtable program manager at Westinghouse Corp. in Pittsburgh, Pa. Prior to her current appointment, she was a participant in Westinghouse's Campus America Program and technical advisor at the Salem nuclear plant in New Jersey.

Mary Donovan was recently appointed to the Conservation Commission in Acton, Mass. For the past two years she has been a civil engineer with the Army Corps of Engineers. Earlier, she was a member of Maryland's Soil Conservation Service.

Mark Duchesne works as a project engineer at Harris Corp., NPD, Dover, N.H.

Pierre Fleurant is now an electrical engineer in the products development department at High Voltage Engineering, Burlington, Mass. He is also a category IV senior in the United States Cycle Federation (USCF), and rides with the New England Bicycle Club (NEBC). He finished ninth out of nearly 100 racers in the New England Championships held in Charlestown, R.I. over Labor Day.

Dean Giacopassi has left his position as a lead engineer in CAD/CAM at the Boeing Commercial Airplane Company, Seattle, Washington, to return to WPI as a teaching assistant. He is studying for his master's degree in mechanical engineering.

Herbert Holmes continues as a highway engineer for the Federal Highway Administration in Tallahassee, Florida.

David Jones serves as a liaison engineer for du Pont in Wilmington, Delaware. At the present time, he is working on renovations to restart a mothballed defense nuclear reactor.

Carlton Klein has been working as a strategy analyst at GE in Fairfield, Conn. In September he took a leave of absence to finish his last year at Harvard.

Ruth Lipman, a graduate student at WPI, attended the Symposium on Ocular and Visual Development in Philadelphia last June. That same month she also attended the Tissue Culture Association meeting in Washington.

Robert Lundin received his doctor of dental medicine degree from Tufts University in June. Currently, he is a general dental officer for the Department of Health and Human Services, Public Health Service, in Rockville, Md.

Francis Marchand works as a product engineer at MPB Corp. in Keene, N.H.

David Markey is a research engineer at Wyman-Gordon, North Grafton, Mass. Last year he received his MS from RPI.

Joseph Maslar continues as an MBA student at the University of California at Berkeley.

1/Lt. **Marc McCalmont** has reported for duty with the Marine All Weather Attack Squadron 224, Marine Corps Air Station, Cherry Point, N.C. He joined the Marine Corps in 1978.

Lou Nay is CSSE manager for Digital Equipment Corp., Marlboro, Mass. The Nays live in Wayland and have two children.

Woodrow Saccoccio has been promoted to associate engineer at Northeast Utilities in Connecticut. He joined NU last year as an assistant engineer in the generation engineering instrumentation and control department. Besides WPI, he attended Ripon College in Wisconsin.

Last year, **Joseph Sage** received his master's degree in architecture from the University of Wisconsin at Milwaukee. He is now an architect-planner for the Ehrenkrantz Group, New York City.

John Vestri, Jr. works as a production control administrator at Hughes Aircraft Co., Fullerton, Calif.

Dean Wilcox is one of the first four employees of the Electric Boat Division of General Dynamics selected to participate in a new executive training course called the Advanced Career Development Program. The program is designed to support the shipyard's upper management needs and requirements. In the two-and-a-half year program, the participants will undertake three special assignments with assistant general managers and two shipyard assignments in such areas as trades, testing and engineering. At the conclusion of the program, they will be placed in key shipyard management posts at headquarters in Groton, Conn. Wilcox joined Electric Boat in 1978.

1979

▶*Married:* **Annemarie Bernard** to Ernest G. Nelson on October 10, 1981. The bride is a programmer/analyst at Norton Co., and is studying for her MBA at WPI. Her husband is an industrial engineer at Norton. He has a BS in engineering from Lowell Tech and an MBA from Clark. . . . **Douglas C. Clark** and Deborah Megill in Naugatuck, Connecticut on September 26, 1981. Mrs. Clark graduated from Becker with a degree in physical therapy. Formerly, she was employed in the office of American Refining and Chemical. The bridegroom is a computer design engineer for Pratt & Whitney Aircraft in East Hartford. . . . **Thomas O. Converse** and Hollie J. Guettler on June 20, 1981 in Adams, Massachusetts. The bride attended Berkshire Community College, Pittsfield. Her husband is with W.C. Grace & Co. . . . **William P. Donoghue** to Mary E. Morelli in New Britain, Connecticut on October 17, 1981. The bride graduated from St. Joseph College and is employed in the Office of Grants Administration and Welfare Department for the City of New Britain. The groom serves as an electrical design engineer for Hamilton Standard, Windsor Locks.

▶*Married:* **William H. Englemann** and Phyllis Ann White in Arlington, Massachusetts. The bride graduated from Arlington High School and is employed by Raytheon Corp., Lexington. The groom works for Analog Devices, Norwood, Mass. . . . **Thomas McColl** to Beth DiMaggio on August 22, 1981 in Norwichtown, Connecticut. The bride graduated from Assumption College, Worcester, Mass. The groom is with Electric Boat-General Dynamics in Groton, Conn. . . . **Donald O. Patten, Jr.** and Janice L. Costello on August 29, 1981 in Morris, New York. Mrs. Patten graduated from Becker and has been studying for her BS degree in physical therapy at the University of Connecticut at Storrs. Her husband is employed in manufacturing management by Procter & Gamble.

▶*Married:* **Jeffrey L. Sauer** to Deborah F. Spear in Danbury, Connecticut on October 24, 1981. The bride graduated from Western Connecticut State College with a BS in biology and secondary education. She teaches science at Westhill High School, Stamford. The groom is with Perkin-Elmer Corp. in Danbury. . . . Lt. **Thomas H. Soszynski**, USAF. and Lt. Christine M. Aziz in Leominster, Massachusetts on August 22, 1981. The bride graduated from Leicester Junior College, received her BS from Worcester State, and was enrolled in the ROTC program at Holy Cross, where she received her commission in 1980. The groom earned his wings in a USAF ceremony in Columbus, Miss. last March, and previously received his ROTC commission at Holy Cross. Currently, he is stationed with the Strategic Air Command in Plattsburgh, N.Y.

▶*Married:* **Craig H. Thompson** and Shari A. Anable in Westboro, Massachusetts on August 29, 1981. The bride, a graduate of Westboro High School, was a nurse's aide at Westboro Nursing Home. Her husband is a student at Syracuse University. He was employed by Bigelow's Nursery, Northboro. . . . **Susan M. Turner** and William C. Dass in Auburn, Massachusetts on October 10, 1981. Mrs. Dass holds a master's degree in geotechnical engineering from Cornell University. She is a geotechnical engineer for D'Appolonia in Albuquerque. The bridegroom has a master of engineering degree from Cornell and is a research geotechnical engineer for Applied Research Associates, Albuquerque.

Bob Avarbock serves as a senior firmware engineer at Digital in Hudson, Mass.

Phil Cameron, who is with Clairol in Stamford, Conn., took part in the placement seminar held at WPI last fall.

Jih-Tseng Chang served as a guide and interpreter for Prof. Donald Zwiep in August when he was in Taipei, Taiwan for the ASME.

Tony Doornweerd is a highway engineer for C.E. Maguire, New Britain, Conn.

For the next three years, **Ken Fast** will be doing missionary work in Europe.

General Electric in Hendersonville, N.C. employs **Michael Gallerani** as a specialist in management engineering.

Recently, **Jim Grant** completed the Edison Engineering Program at GE in Schenectady, N.Y. The two-year program consists of rotating engineering assignments and technical education through GE's Advanced Course in Engineering. He calls the program "demanding, but worth it." A product design engineer, he is also finishing up his master's degree at RPI.

Kevin Grealish now works for Martin-Marietta Co., Denver, Colorado.

1/Lt. **Robert Gregorio** serves as a platoon leader for the U.S. Army at Ft. Irwin, Calif. "In the middle of the Mojave Desert."

Richard Keirstead is currently pursuing his master's degree at WPI.

Stephen Lefemine is a field sales engineer at Warren Pumps, Inc., Atlanta, Georgia. He and Francyne reside in Dunwoody.

David Lodigiani is a technical service engineer at Loctite Corporation in Aurora, Ill.

Eugene Ogborn has been promoted to senior project manager in the systems development organization of State Mutual Life Assurance Company of America. He joined State Mutual as a systems analyst in 1972 and was promoted to senior systems analyst in 1975 and to project manager in 1978. He has a master's degree in management from WPI.

Paul Peterson is a senior underwriter at State Mutual, Worcester.

Bill Razeto is employed as a stress engineer on the 757 program at the Boeing Co. in Seattle, Washington.

Robert Schifiliti, a systems consultant for Mass Fire Alarms, Lowell, Mass., is presently enrolled in the WPI master's degree program in fire protection engineering.

Joseph Silva works for GE in Wilmington, Mass.

Jack Tracy, Jr. works as an operations analyst at Exxon in Norwalk, Conn.

Felix Vargas continues as a test equipment design engineer at Prime Computer, Inc., Framingham, Mass. He has an MSEE from WPI.

Neil Volkmar is an applications engineer for GE Information Service, Oakland, Calif.

1980

►*Married:* **Keith J. Backman** and Shaileen Zukowski on August 22, 1981 in Milford, Connecticut. Mrs. Backman holds a scholarship for graduate study at Catholic University for her master's in social work. She graduated from Assumption College. Her husband is a civilian engineer for the U.S. Air Force in the Washington, D.C. area. . . . **Brian F. Biernacki** and Lucille D. Lovely in Worcester. The bride, formerly a recorder in the registrar's office at WPI, graduated from Quinsigamond Community College. The bridegroom is a field engineer at Dresser Atlas Wireless Services in Seminole, Oklahoma. . . . **Charles H. Crowley** to Linda M. Martin in Hudson, Massachusetts on August 1, 1981. Mrs. Crowley graduated from Becker and is an administrative assistant at Business Journals, Inc., Norwalk, Conn. The bridegroom serves as a chemical engineer at Polycast Technology Corp., Stamford, Conn.

►*Married:* **Michael J. Herberg** and Cheryl A. Pettis in Auburn, Massachusetts on August 15, 1981. Mrs. Herberg attended Fitchburg State College and is now a student at Russell Sage College, Troy, N.Y. Her husband is a chemical engineer for GE in Schenectady and a student at RPI. . . . **Stephen A. Kossakoski** to Eileen M. Cole in Glastonbury, Connecticut on August 1, 1981. The bride graduated from Keene (N.H.) State College. The groom graduated from Keene State College last year. They are both teachers in Kingston. . . . **Robert J. Martinek** to Laurie E. Benjamin on October 10, 1981 in Torrington, Connecticut. The bride attended Mattatuck Community College and Western Connecticut State College. Her husband serves as a design engineer at the Raytheon Company in Sudbury, Mass.

►*Married:* **Rosemary A. Murphy** and Timothy C. O'Brien in Housatonic, Massachusetts on September 19, 1981. The bride is a process development engineer for Arthur D. Little, Inc., Cambridge, Mass. The bridegroom holds the post of project engineer at Stone & Webster Engineering, Boston. He graduated from RPI. . . . **Elaine C. O'Neill** to Michael S. Yarnall in Needham, Massachusetts on August 22, 1981. The bridegroom graduated from RPI as a chemical engineer. Both the bride and groom work for Clairol in Stamford, Conn., and attend graduate school: she at the University of Connecticut and he at New York University. . . . **Aivars Reks** to Christine O'Malia in Norton, Massachusetts on August 15, 1981. Mrs. Reks attended Dean Junior College. Her husband is employed by Hughes Aircraft in California.

Douglas Beller works as an associate engineer at Yankee Atomic Electric Co., Framingham, Mass.

John Caola of the WPI mechanical engineering department attended the Virginia Polytechnic Institute and Virginia State University Conference program co-sponsored by NASA Lewis Laboratories in September.

Garry Crane is with General Electric in Utica, N.Y.

Grace Crooker currently works for the EPA in Denver, Colorado and is concerned with hazardous waste. Before her transfer, she was with the EPA in Lexington, Mass.

John Cybulski continues as a supervisor in the manufacturing and management program with GE in Holland, Michigan.

J.A. DeMauro holds the post of division manager at AT&T in Lisle, Illinois.

Paul Doherty is a graduate student at the University of Michigan in Ann Arbor.

In August, **Bill Durkin** broke his ankle while climbing Mt. Washington in New Hampshire. He was climbing the 6,288-foot mountain with **David Beech**. Durkin managed to complete the trip by tightening the straps on his boots even though the fall occurred more than a mile from the end of the hike.

Perry Esposito now holds the post of operational service engineer at Matsco Fermi II, Monroe, Mich.

Edward Johnson continues as a sales engineer at Torrington Co., South Bend, Indiana.

Chandrashekhar Joshi recently received his MSME from MIT. He is with Thermo Electron Corp., Waltham, Mass.

John Kennedy is a technical staff member at Charles Stark Draper Lab., Cambridge, Mass.

David Konieczny works for Bechtel Power Corp., Berwick, Pa.

Peter LaBelle serves as an electrical software design engineer at Texas Instruments in Dallas, Texas.

James Lafferty is employed as a product engineer at Foster Pump Works, Westerly, R.I.

Don Maki works as a resins production supervisor at Borden Chemicals, Inc., Fayetteville, N.C.

John Moriarty recently accepted a transfer from the Victoria plant to the Deer Park, Texas plant at du Pont.

John Neilon is a planning technician for Dade County Planning Department in Miami, Fla.

Eric Northrop is a member of the technical staff at Bell Labs, Naperville, Ill. In December he was slated to receive his MSEE from Purdue.

Capt. **Thomas Nowak** serves as a project engineer for the Army Corps of Engineers, Dayton, Ohio.

Richard Stephens is a sales engineer involved with mobile fluid product sales at Dana Corp., Paramus, N.J.

Louis Travaglione works as an associate engineer at Lockheed Missiles & Space Co., Sunnyvale, Calif.

Chuong Le Vu serves as a member of the advanced engineering program at Honeywell Information Systems, Billerica, Mass. He is slated to receive his MS in computer science from BU in 1982.

Francis Walsh, Jr. is a plant engineer for W.R. Grace & Co., Chicago.

Mary Westberg serves as an industrial engineer at Rochester Products, Division of GM, Rochester, N.Y.

1981

►*Married:* **Jeffrey C. S. Alexander** and Patricia M. Pinette in East Falmouth, Massachusetts on August 29, 1981. The bride attended Bridgewater State College. Her husband is an industrial engineer with Hughes Aircraft in Fullerton, California. . . . **Robert R. Breault** to Doreen A. Rossi in Pawtucket, Rhode Island on September 19, 1981. Mrs. Breault graduated from Bryant College and is employed in the CPA office of Keenan, Tripp, and Company, Ltd., Providence. The groom serves as a junior industrial engineer at Chesebrough-Ponds, Inc., Clinton, Conn. . . . **Mark J. Burzynski** and Cynthia J. Lunt on September 26, 1981 in Southbridge, Massachusetts. The bride graduated from Eastern Connecticut State College and Worcester State College. She is a special education teacher at Laurel Hill School, Norfolk, Conn. Her husband works for Torrington (Conn.) Co. . . . **Robert C. Fuller** and Mary E. Whitelaw on August 15, 1981 in Centerville, Rhode Island. Mrs. Fuller attends Holy Cross. Her husband is with G.M. Industries in Seekonk.

▶*Married:* **Richard E. Grimley** to Donna M. Sansoucie in Northbridge, Massachusetts on August 22, 1981. The bride, a registered nurse, attended Worcester State College and graduated from City Hospital School of Nursing. The groom is a production engineer at IBM Corp., Manassas, Va. . . . **Trevor Jones** and Lori Vertucci in Trumbull, Connecticut on September 26, 1981. . . . **James D. Lafferty II** and Elizabeth A. Rososky in Westboro, Massachusetts on July 11, 1981. The bride is a student at Southeastern Massachusetts University, North Dartmouth. The groom serves as a mechanical engineer at General Dynamics, Electric Boat, Groton, Conn. . . . **Jeffrey F. Regan** and Mary Beth Koran in Monson, Massachusetts on August 1, 1981. The bride, a registered nurse, is employed in the coronary thoracic intensive care unit at UMass Medical Center.

▶*Married:* **Alan M. Rodrigues** and Donna E. Jobson on September 12, 1981 in Wilbraham, Massachusetts. The bride, who graduated from Holyoke Community College, has been an assistant manager for The Gap Stores, Inc., Enfield. The bridegroom works as a mechanical engineer in El Segundo, Calif. . . . **Joseph M. Sobol** and **Barbara A. Anderson, '80** on October 17, 1981 in Rochdale, Massachusetts. The bride is a civil engineer with Elson P. Killam Associates, Inc., Millburn, N.J. Her husband works as a geotechnical engineer with Mueser, Rutledge, Johnston & DeSimone Consulting Engineers, New York City. . . . **James Waclawski** to Joan E. Shoaf in Wethersfield, Connecticut on August 21, 1981. Mrs. Waclawski graduated from Clark University. The groom is an associate engineer with Westinghouse in Baltimore, Maryland.

Currently, **Naney Berube** is a first-year medical student at the University of Massachusetts Medical School in Worcester. She is married to John F. Stevens of Ontario, New York.

Valerie Boynton works in the information systems department at Pratt & Whitney Aircraft, East Hartford, Conn.

James Bozeman serves as a teaching assistant at the University of California in Santa Barbara.

Gary Brown has accepted a post as production engineer at Allied Corp. in Hopewell, Va.

Mark Caldwell serves as an ensign in the U.S. Navy. He is based at the Naval Aviation Schools Command, Pensacola, Fla.

Joe Colangelo has been employed as an electrical design engineer at Texas Instruments in Dallas, Texas.

Steve Dellaporta, who recently received his PhD from WPI, has accepted a research post at Cold Spring Harbor Research Laboratories on Long Island in New York.

Joseph Desjardins has joined Motorola in Ft. Lauderdale, Fla.

For the next two years, **David Dombrowski** plans to study for his MSME at MIT, where he serves as a graduate research assistant.

Continuing with Bechtel Power Corp., **Beverly Elloian** is currently working on the Three Mile Island project.

Joseph Gionfriddo serves as a team manager for Procter & Gamble in Mchoopany, Pa.

Mary Goodrow is now with GE in Jefferson, Ohio.

Casey Gordon continues as a development chemist at Hercules, Inc., Wilmington, Delaware.

Timothy Gottlieb works as a field engineer at Schlumberger Well Service, Laredo, Texas.

Marshall Houskeeper has been employed by Dresser Atlas as an operations engineer in Houston, Texas.

David Ireland, a member of the technical staff at Bell Laboratories, North Andover, Mass., is currently a student at Stanford University.

Amanullah Khan is a teaching assistant at WPI in the ME department.

Lisa Koseiuezyk is a civil engineering assistant for the Los Angeles County Flood Control District in California.

Bruce MacLeod serves as an assistant civil engineer for the County of Los Angeles, Los Angeles, Calif.

Ralph Malboeuf works at General Instrument of Hicksville, N.Y.

Steven McDonald holds the post of associate test engineer at Data General Corp., Westboro, Mass.

Anthony Napikoski has accepted a post as a distribution protection engineer at United Illuminating in New Haven, Conn.

Brita Nelson has been appointed to a process engineering position with International Paper Company's Hudson River mill, Corinth, N.Y.

Ali Reza Paravar is studying for his PhD in the chemical engineering department at Cleveland State University, Cleveland, Ohio.

Thomas Perry is employed as a mechanical engineer at Norfolk Naval Shipyard in Portsmouth, Va.

Gary Poole works as a research engineer at Eastman Kodak in Rochester, N.Y.

Lisa Reis has joined Eastman Kodak as a manufacturing engineer in Rochester, N.Y.

Richard Rempe is employed by Exxon Corp., Houston, Texas.

James Ricci has been employed as a plant manager by Eastman Kodak.

Roland Roberge has accepted a field engineering position with GE's Installation and Service Engineering Division (I&SE) in Schenectady, N.Y. He will receive technical training at I&SE's Field Engineering Development Center and on-the-job assignments with I&SE and GE products departments as a member of the company's field engineering program.

Scot Robertson has been named as a design engineer at Texas Instruments in Houston.

Richard Rodgers continues as a teaching assistant in the mechanical engineering department at WPI.

Frederick Rook is studying for his MS in electrical engineering at the University of Virginia in Charlottesville.

Frank Silveira has joined Polaroid Corp., Cambridge, Mass.

Bradford Steinka works as an associate engineer at Codex Corporation in Mansfield, Mass.

Grant Swan serves as a cost engineer at IBM in San Jose, Calif.

Anne-Marie Sylvia is employed as a manufacturing engineer at IBM in Charlotte, N.C.

Michael Teague works as a process supervisor at Pfizer, Inc., Groton, Conn.

James Thurber has been named an associate engineer at Baltimore Gas & Electric, Baltimore, Md.

William Ure is a second lieutenant in the U.S. Air Force out of Dayton, Ohio.

Richard Urella works as a purchasing manager at U.S. Gasket & Shim Corp., Danielson, Conn.

For the past three years, **William Waller** has been employed as a science writer at the Harvard-Smithsonian Center for Astrophysics in Cambridge and at Northeastern University in Boston. Prior to that he received his BS from the University of Arizona. He recently received his MS in physics from WPI, and is now pursuing a doctoral program in astronomy at the University of Massachusetts, Amherst.

Thomas Warnick serves as an associate manufacturing engineer at Honeywell Electro Optics in Lexington, Mass.

Dave White has been named an electrical design/nuclear engineer I at Combustion Engineering, Inc., Windsor, Conn.

School of Industrial Management

Paul Mitchell, '57 holds the post of product manager at Dresser Industries, Monrovia, Calif.

Theodore Strojny, '61, has been named executive vice president and general manager of Anderson Operations (Bay State Abrasives) in Worcester. He has been manufacturing manager at Anderson since last year. In 1950, he joined Bay State Abrasives. During his career, he has served as plant manager and managing director of the company's manufacturing plant in Steinsel, Luxembourg. The Anderson Operation makes wire brushes, hole saws, and non-woven abrasive wheels.

Master of Natural Science Program

William Morse, '68 has been appointed as a physics teacher in the Science Department at Pinkerton Academy, Salem, N.H. He holds a PhD in natural science from Brownell University and has 14 years' teaching experience, the last three of which have been at Nute High School. He also has a B.Ed. from Keene State.

Ralph Worden, '74 was recently promoted to safety director for Kingsbury Machine Tool Corp. of Keene, N.H. He will continue as environmental protection coordinator, a job he has held since joining the company last year.

Frank Sannella, long-time cross country and track coach at WPI, died on August 26, 1981 in Webster, Massachusetts at the age of 82.

For 29 years, he served as cross country coach at WPI. From 1945 to 1954 he was track coach. In recognition of his many years of service, the alumni road race held during Homecoming in October, was renamed the "Frank Sannella Alumni Fun Run."

Mr. Sannella was born in Italy and lived in Oxford, Mass. for 51 years. He attended Bates College in Maine where he was a member of the track team. In 1926 he was named a teacher-coach at Oxford Senior-Junior High School. He coached all sports, including varsity and junior varsity and junior high basketball and baseball.

He helped organize a small school debating league. Also, he coached drama, debating, and public speaking, continuing after he became principal of Oxford's senior-junior high school in 1930.

Mr. Sannella did graduate work at several colleges and received a diploma for football and basketball coaching at Washington and Lee University. In 1937 he received his master's degree in school administration from Boston University and was certified by the State Department of Education. He did further graduate work at Calvin Coolidge College in Boston.

In 1954, he became superintendent of the Oxford schools, after serving as high school principal for 24 years. In 1965 he retired as superintendent.

He was on a research committee that led to the construction of the Southern Worcester County Regional Vocational School in Charlton. Civic-minded, he was active with the Lions Club, the Red Cross, District Nursing Association, Learned Entertainment Committee, and the Oxford Chapter for the Prevention of Cruelty to Children. He pioneered the Oxford playground and recreation program.

For several years he was educational advisor to Hahnemann Hospital School of Nursing. He was a past president of the Worcester County Teachers' Federation and of the Worcester County Principals' Association, as well as a former area chairman of the Committee on Athletics for the Massachusetts Principals' Association.

Mr. Sannella was a founder and first chairman of what is now the Clark University Basketball Tournament, and he organized the first league for track and cross country for small schools in the Worcester area.

Harold M. Somerville, a former research technician at WPI, died on September 8, 1981 in Worcester. He was 74.

From 1938 to 1965 he owned and operated the Lake Ripple Garage in North Grafton. Until his retirement in 1975, he was a research technician in mechanical engineering in the internal combustion laboratory at WPI.

A well known chinchilla breeder, in 1969 he won the Breeder's Award Plaque for 18 prize winners out of 20 entered at the Standard Live Animal Show in Boston. In a 1970 newspaper article, he was described as one of the biggest New England breeders of the top-flight fur, Empress chinchilla.

Mr. Somerville was a member of the Episcopal Church, the Masons, and the Mendelssohn Singers. He was a native of Windsor, Vt. A resident of North Grafton for 43 years, for the last two years he lived in West Bradenton, Fla.

Paul E. Twiss, '10 died in the Americana Health Care Center, Winter Park, Florida on October 21, 1981.

Before retiring in 1948, he was a development and design engineer for General Electric Co., West Lynn, Mass. for 38 years. He was a 50-year member of the Masons and belonged to the AIEE and the Odd Fellows.

In 1910 he graduated with his BSME from WPI. He was born in Jaffrey, N.H. on April 7, 1888.

Frank M. McGowan, '12, a retired owner and treasurer of William M. Bailey Company, died in a nursing home in Braintree, Massachusetts on September 12, 1981. He was 91 years old.

He was a trustee emeritus of New England Deaconess Hospital in Boston, and a recipient of the BSA Silver Beaver Award. A trustee of the King Family Trust of Quincy, he also belonged to the ASCE and Theta Chi and was a 50-year member of All Souls Men's Club in Braintree. He was a 32nd degree Mason.

Mr. McGowan was born on March 5, 1890 in Swansea, Mass. He received his BSCE from WPI in 1912 and was a professional engineer in Massachusetts. He was a World War I Army veteran.

J. Arthur Planteroth, '13 of Hightstown, New Jersey passed away recently.

He was born on June 11, 1886 in New York City. In 1913 he graduated as an electrical engineer from WPI, after having received his BA from the College of the City of New York in 1906. He also was a student at the University of Chicago, Adelphi College of Brooklyn, and Columbia University.

During his career, Mr. Planteroth was with New York & Queens Electric Light & Power Co. and Consolidated Edison Co., New York City. For several years he taught in the New York public school system.

Charles S. Howard, '18 of Los Altos, California died on October 28, 1981.

A native of Townsend, Mass., he was born on July 21, 1896. In 1918 he graduated as a chemist from WPI. In 1957 he retired from the U.S. Geological Survey after 37 years. He had served as district chemist for the Survey.

Dr. Howard, who received his MS and PhD in chemistry from American University, Washington, D.C., was known as an authority on the chemical quality of water of the Colorado River and on the sediment load of the Colorado and other southwestern streams.

He was the co-author of a series of papers dealing with density-current flows in Lake Mead and he prepared many other papers for publication by technical journals and the Geological Survey. During his lifetime he was in charge of the water resources laboratory in Albuquerque, N.M. He belonged to Phi Sigma Kappa, the American Chemical Society, the ASCE, American Water Works Association, and the American Association for the Advancement of Science. He was a veteran of World War I.

Lewis F. Lionvale, '18 died in the Veteran's Hospital in Reno, Nevada on July 21, 1981, following a long illness.

He was born on Feb. 8, 1897 in Hartford, Conn. In 1918 he graduated from WPI as a mechanical engineer, then joined the U.S. Navy and served as a lieutenant-chief engineer on a minesweeper. Later, he was employed by U.S. Rubber Co., S.I. Ward & Co., Shell Co. of California, General Petroleum Corp., and Associated Oil Corp.

From 1933 to 1963 he was an administrative assistant and fire prevention engineer in the office of the California State Fire Marshal. He belonged to the National Fire Protection Association, the Society of Fire Protection Engineers, and Tau Beta Pi.

He was a past president of the Golden Gate Angling Club (San Francisco) and of the State Men's Club in Sacramento. He enjoyed fishing in the Northwest and foreign travel.

Herbert E. Brooks, '20, former chairman of the board and owner of the Conant Ball Company, Gardner, Massachusetts, died in Henry Heywood Memorial Hospital on October 23, 1981. He was 83.

Mr. Brooks was associated with the furniture manufacturing firm for 61 years, having joined the company in 1920 as assistant superintendent. From 1933 to 1936 he was assistant treasurer. In 1936, along with other family members, he purchased control of the business. He served as president from 1936 to 1949, and became company treasurer when his father retired in 1949. He was chairman of the board from 1974 until his retirement in 1979.

A Gardner native, he was born on May 12, 1898. He graduated as a mechanical engineer from WPI in 1920 and belonged to SAE and Skull. He was an Army veteran of World War I.

He was a member of the New England Association of Furniture Manufacturers, which he had served as director. A leader in his field, he was called to testify before the World War II Price Control Board in Washington, D.C.

Mr. Brooks was a former vice president of the Worcester Chapter of the WPI Alumni Association, as well as a representative to the Alumni Council. Active in the community, he was affiliated with the Boy Scouts and had belonged to the Monomonoc Sporting Club, the Rotary Club, and the Congregational Church. He was a director of the First National Bank of Gardner and a past president of the Gardner Home for Elderly People, and of the local United Fund. He was a 50-year Mason and the father of Stephen Brooks, '46.

E. Daniel Johnson, '21 died in a Nashua, New Hampshire hospital on October 6, 1981 following a brief illness. He was 82 years old.

In 1965 he retired after 41 years as New England sales engineering representative for Buffalo Forge Company, working out of the Boston regional office. Prior to joining Buffalo Forge, he was with AT&T.

Mr. Johnson served with the U.S. Navy during World War I and later in the Naval Reserve. He was a Mason, a Shriner, and a director of Lions International, as well as the founder and first chairman of the Massachusetts Lions Eye Research Foundation.

He was a trustee of the Amherst Library and a volunteer clerk for the Wilkins School additions. A member of the Congregational Church, he also was active on numerous Amherst town committees. He belonged to SPE and Tau Beta Pi, was a former president of the Boston Chapter of the Alumni Association, and a past member of the Executive Committee, the Fund Board, and the Alumni Council.

A native of Manchester, N.H., Mr. Johnson was born on Jan. 1, 1899. In 1921 he graduated from WPI as an electrical engineer.

Roy G. Bennett, '22 of Melrose, Massachusetts recently passed away.

He was born on Sept. 15, 1900 in Groton, Mass. In 1922 he received his BSME from WPI. For 43 years he was with General Electric, spending his last twenty years in the marine sales office in Boston. He retired in 1965.

A member of the Society of Naval Architects and Marine Engineers and the American Society of Naval Engineers, Mr. Bennett also belonged to the Masons, SPE, and Tau Beta Pi. He had been president of the Spectacle Pond Association and a deacon of the Congregational Church. He was a former president of the Boston Chapter of the Alumni Association, and an Alumni Council representative.

J. Norman Alberti, '24, a WPI trustee emeritus, died in East Harwich, Massachusetts on August 20, 1981. He was 80 years old.

Besides serving WPI as a trustee, Mr. Alberti had also been a member of the Fund Board and the Alumni Council. He was a past chairman of the development program for the Connecticut Valley area, and past president of the Connecticut Valley Chapter of the WPI Alumni Association. He was class gift chairman for his 50th reunion.

In 1966, following 42 years with General Electric, he retired as Springfield manager of the firm. He belonged to the GE management group, the Elfun Society. He was a former president of the Springfield YMCA and Rotary Club. For many years he served as water commissioner in Longmeadow.

He was an officer of the Engineering Society of Western Massachusetts, the AIEE, and Goodwill Industries. Other community involvements were with the Chamber of Commerce, Junior Achievement, and the United Fund, as well as with the Longmeadow Men's Club.

A 50-year member of the Old First Church, Mr. Alberti was active as a church moderator, deacon, and teacher. Also, he was chairman of the financial board and was on the Board of Education and World Services. He belonged to the building and music committees.

Mr. Alberti was a vice president of the Springfield Council of Churches and served on the Council's Board of Finance and Urban Ministry Committee. At one time he was vice president of the former MacDowell Male Choir.

He was born in Greenfield, Mass., and received his BSEE from WPI in 1924. He belonged to Theta Chi and was a registered professional engineer.

Stephen J. Vouch, '24 of Vero Beach, Florida died on November 1, 1981 after a brief illness. He was 79 years old.

From 1924 to 1964, when he retired, he was with General Electric Company, Erie, Pa., where he served as a sales engineer.

He graduated with his BSEE in 1924. A native of Peekskill, N.Y., he was born on Jan. 13, 1902.

Harold Hansen, '25, a long-time employee of Champion International, died in Canton, North Carolina on October 20, 1981.

He was born on April 23, 1902 in Kroken, Sweden and came to America at age 5. In 1925 he received his BSEE from WPI. Following graduation, he worked for Riley Stoker in Worcester for three years. In 1928 he joined the Champion Fibre & Paper Co. (now Champion International) where he was employed until his retirement as superintendent of the firm's steam and power plant in Canton.

Mr. Hansen belonged to the Engineering Club of Western North Carolina, the American Pulp and Paper Superintendents' Association, Tau Beta Pi, and the Knights of Pythias, which he served in various offices. He was a registered professional engineer in North Carolina and Ohio, and a former member of the Western North Carolina Air Pollution Control Board.

After retiring in 1964, the Hansens traveled in Europe and throughout the U.S. Mr. Hansen enjoyed gardening. Besides writing and editing an outline for a two-year vocational course in practical electricity, he contributed brief articles to *Power* and *Power Plant Engineering*.

Vahan B. Kurkjian, '26, a retired engineer for NASA, passed away in New Haven, Connecticut on July 12, 1981 at the age of 81.

He was born on Jan. 1, 1900 in Arabkir, Armenia. He graduated from WPI with a BS in electrical engineering. Before retiring in 1969, he worked for the U.S. Navy for 25 years in Cleveland, Ohio, and Washington, D.C. His last assignment was as contracting officer for the Naval Ordnance Systems Command.

Earlier in his career, Mr. Kurkjian worked for Dennison Mfg. Co., American Tube Works, the Massachusetts Department of Public Safety, and the War Department.

Arthur M. Cheney, Jr., '28, a retired engineer from Heald Machine Co., died on November 6, 1981 in Worcester at the age of 75.

A native of Orange, Mass., he was born on Sept. 7, 1906 and later received his BSME from WPI. During his career he was with Rodney Hunt Machine Co., SW Card Co., and Heald Machine-Cincinnati Milacron, from which he retired in 1968 following 27 years of service.

Mr. Cheney belonged to SPE and the Massachusetts Professional Engineers Society. He was a past master of the Masons and a former member of the Westboro Finance Committee and of the Episcopal Church building fund committee. In World War II he served in the U.S. Army.

Donald C. McLeod, '34 died unexpectedly on October 31, 1981 at his home in Dartmouth, Massachusetts. He was 70.

Born in South Dartmouth, Mass., he later became a member of the Class of 1934. Until his retirement, he was a tool engineer at Morse Cutting Tools. He belonged to the Grange, the Masons, and the Society of Manufacturing Engineers.

For 20 years he was treasurer and for 30 years the organist for the Smith Neck Friends Meeting. Also, for 20 years he was clerk of the Sandwich quarterly meeting of Friends of New England yearly meetings.

Richard W. Rhodes, '34 died in a rest home in Signal Mountain, Tennessee on September 15, 1981 at the age of 69.

He was head chemist for Dupont Biscoloid Co., Chattanooga before retiring in 1970. He belonged to the ACS.

Mr. Rhodes, a member of Sigma Xi, was born on May 12, 1912 in Worcester and received his BS in chemistry in 1934. In World War II he was a second lieutenant with the U.S. Navy stationed in Washington, D.C. Later he was a lieutenant commander in the USNR.

Philip W. Stafford, '34, a retired U.S. Navy engineer, died on October 26, 1981 at Cape Cod Hospital, Hyannis, Massachusetts following a lengthy illness. He was 68.

For nearly 40 years he was a naval engineer for the U.S. Navy Department Bureau of Ships. During World War II, he was with the Navy in the Pacific.

He belonged to the Society of Naval Engineers, the Wanderbirds Hiking Club of Washington, D.C., and Tau Beta Pi. He was born on Jan. 5, 1913 in Middleboro, Mass. In 1934 he graduated from WPI as a mechanical engineer.

Preston H. Hadley, Jr. '35 died of ALS (Lou Gehrig's Disease) at his home in Crofton, Maryland on August 22, 1981. He was 68 and a native of Bellows Falls, Vt.

He joined Gibbs & Cox, Inc. (naval architects and engineers) in 1935 after receiving his BSME from WPI. He participated in the design of the "S.S. America" as well as many U.S. destroyers, and during World War II was involved in the design and production of British cargo ships, several classes of U.S. Navy ships, and the U.S. Coast Guard WIND Class icebreakers.

After World War II, he worked on the design and engineering development of the "S.S. United States" until 1947 when he joined Almon A. Johnson, Inc., as a marine engineer, later becoming the firm's general manager in 1950. He continued with the latter firm until 1959.

Mr. Hadley then returned to Gibbs & Cox as a special assistant to the president, subsequently being appointed vice president in 1961. As vice president he was responsible for surveying Canadian shipyard capabilities to build destroyers, among other important projects. Later, after having helped establish the firm's Washington area office, he became vice president for marketing. In 1978 he retired.

A member of Phi Gamma Delta, Mr. Hadley also belonged to the American Society of Naval Engineers, which he served two terms on the National Council. He was a former chairman of the Society's New York Metropolitan Section, as well as past president of the Westfield (N.J.) Glee Club.

Thomas J. Healey, '36 passed away recently.

He was born Nov. 5, 1912 in Worcester. In 1936 he graduated as an electrical engineer from WPI. Formerly, he was with New England Telephone & Telegraph Co. He belonged to SAE and was a veteran of World War II.

Charles C. Tanona, '44, an engineering executive at Union Carbide Corp., died on October 2, 1981 in Charleston, West Virginia. He was 58.

A Worcester native, he was born on November 21, 1922. He graduated from WPI as a chemical engineer and received his MS in 1948. An associate director of engineering in the hydrocarbon division of Union Carbide, South Charleston, he was employed there for 33 years.

Mr. Tanona joined Union Carbide in 1948 and spent most of his time with the engineering department of the Chemicals and Plastics Division. Over the years he held a number of posts including that of group leader in engineering and engineering manager for silicones. He belonged to ACS, AIChE, and he was a registered professional engineer in California, Texas, and West Virginia. He was an Army veteran of World War II.

David E. Estey, '53 died at the home of his sister in Natick, Massachusetts on October 1, 1981.

He was a district manager for General Electric in Washington, D.C., where he had been employed since 1962. Early in his career he was a sales engineer for Minneapolis Honeywell.

In 1953 he graduated as a chemical engineer from WPI. He belonged to the Congregational Church, and he served in the U.S. Army from 1953 to 1955. He was born in Worcester on May 28, 1929.

Lt. Col. **Howard D. Stephenson, '60** of the U.S. Air Force, for many years reported missing in action, has recently been declared dead.

He was born on Oct. 6, 1937 in Concord, Mass. In 1960 he graduated with a BSME from WPI. Following graduation he entered the U.S. Air Force Officer Training School. During his career he was a navigator and an electronic warfare officer and instructor at Castle AFB in California.

Bruce R. Webber, '65 died September 12, 1981 at Preston Beach, Swampscott, Massachusetts in a scuba diving accident. He was 38 years old.

Police reported that Webber was diving for lobsters with four other divers, when he became separated from the group. The body was later discovered washed up on the beach. Following an autopsy, Webber was ruled to have died of drowning.

For the past 13 years he was employed as an electrical and computer engineer at the Vermont Yankee nuclear power plant in Vernon, Vt. A resident of Greenfield, Mass. he was past president of the local YMCA Men's Club and of Parents Without Partners. He was a former town meeting member and Greenfield Minor Leagues assistant manager. Also, he belonged to a snowmobile club, the Elks, and was a manager for the Babe Ruth Baseball League.

In 1978 he was the recipient of the Rotary Foundation Group Study Exchange trip to Norway. Active with the BSA, he was a troup treasurer.

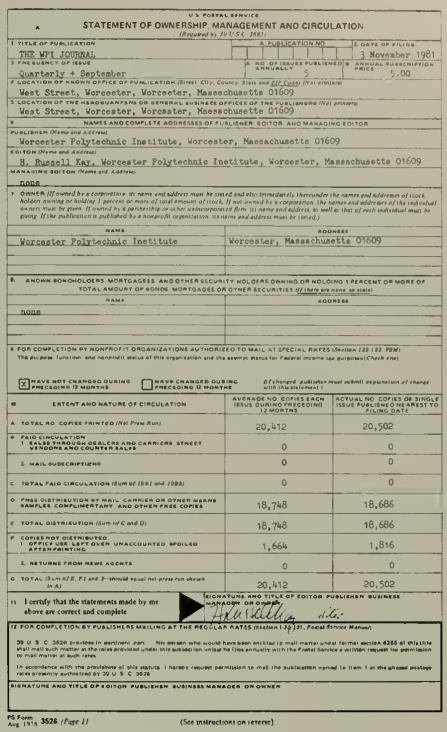
Webber was born on March 28, 1943 in Worcester. In 1965 he received his BSEE. He belonged to Sigma Phi Epsilon and the IEEE.

Ronald Gusowski, '77 of Westboro, Massachusetts died unexpectedly in August following a two-day illness.

He was born on Feb. 10, 1954 in New York City. In 1977 he graduated from WPI as an electrical engineer. He was a design engineer at Data General, where he had been employed since graduation.

William W. Demont, '78, a student at the University of Massachusetts, Boston campus, died July 6, 1981 in Carney Hospital, Dorchester, Massachusetts at the age of 24.

He was born in Gardner and later was a student at WPI. He belonged to the Episcopal Church.



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(Required by 39 U.S.C. 3685)

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PS Form 3526, Aug 1978 (Page 1) (See instructions on reverse)

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

APRIL 1982

Hurry, Springtime!

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

VOLUME 85 NO 4

APRIL 1982

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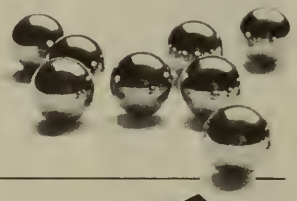

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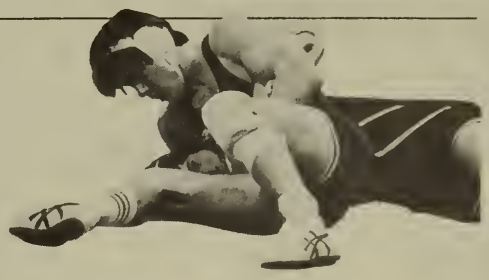

On the cover: A study of light and texture. The dynamic portrayal of Higgins House by WPI's George Schmidt.

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Alumni Information Editor, Ruth S. Trask

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Make Plans Now to Attend

WPI

HOMECOMING 1982

September 24-26

From Donald E. Ross, '54, Publications Committee Chair

It is indeed a pleasure, on behalf of the Publications Committee and the entire WPI Alumni Association, to welcome Kenneth L. McDonnell to WPI as Director of Publications. In addition to producing myriads of catalogs, brochures and other WPI publications, Ken has the enormously important responsibility of serving as Editor of the *Journal*.

Ken comes to WPI from the Wharton School's Applied Research Center, the University of Pennsylvania, where he was Senior Editor. A graduate of the Pennsylvania State University with additional training in journalism and graphic design, he brings much very appropriate experience to his new position at WPI.

Please join me in welcoming Ken McDonnell aboard and wishing him success as a member of the WPI community.

A Note from the New Editor

Let me first thank you for your continuing interest in the WPI *Journal*. In taking over as editor, I am impressed with the fine tradition established by my predecessors and the opportunities presented to me. Credit for much of the *Journal*'s quality must go to Russell Kay, who, for 11 years was instrumental in bringing to the *Journal* sustained improvements in both content and style.

Inevitably, a change at the helm of any magazine carries with it a change in the look and, to a greater or lesser degree, in the focus of the publication. Throughout the change process, however, continuity in the *direction* of the *Journal* is a commitment I intend to maintain.

As a change agent, I am dedicated to upholding WPI's tradition of excellence as well as to breaking new ground. With this issue, we join with three other colleges in a collaborative venture to produce our respective alumni magazines. This *Alumni Magazine Consortium* embraces Johns Hopkins University, Baltimore, where the magazines will be produced; Rensselaer Polytechnic Institute, Troy, New York; Franklin and Marshall College, Lancaster, Pennsylvania; and now, WPI. Economy of scale is one advantage of the consortium arrangement. In addition the member schools are working cooperatively to produce material for a 16-page "core" which becomes part of each school's magazine.

Here's how it works. In the *Journal* your're holding, for example, pages 1–12 are printed *only* for the WPI *Journal*, as are pages 29–40. Obviously, publishing material specific to WPI, like alumni news and profiles, in any other school's alumni magazine would be ludicrous. But readers from each consortium school are at this

Kevin Santry

moment browsing the very same articles that appear on pages I–XVI—the *core*—of this issue of the *Journal*.

Much of this issue, for example, addresses the topic of hazardous waste management, an issue which affects each of us in one way or another. You'll find articles that deal with this controversial subject written from perspectives that are both broad-based and specific to the interests of WPI.

We believe you'll like what you see. But please, let us know what you think of this arrangement. And if you have an idea begging for a forum that reaches far beyond the *Journal*'s audience, let's talk about it. It may find a home in the core of a future issue.

Communication, if it is to be effective, must be a two-way street. I invite your suggestions regarding topics of interest and editorial focus—suggestions that you believe will help us in our drive to become an even better WPI *Journal*.

KMcDon

Editor

Worcester Consortium's Economic Impact Reported

Employment of 6,744 and expenditures of $575 million. These are the figures reported recently by the Worcester Consortium for Higher Education in the report, "Economic Impact of Worcester Higher Education, 1981." Collectively, the nine colleges or universities and one medical school that make up the Consortium are the second largest employer in Worcester after the city of Worcester itself, according to the study.

The operating budgets of the Consortium's members amounted to more than $230 million during academic year 1981–82. A significant portion of the revenues necessary to sustain these budgets was generated from out-of-state sources, e.g., federal grants, contracts, private gifts and tuition from out-of-state students.

The Consortium report details employment as consisting of 5,492 full-time and 1,252 part-time faculty and staff members. WPI's portion of these totals is reported to be 504 full-time and 40 part-time employees, or 8 percent of the Consortium's total employment.

The magnitude of the Consortium's impact on the area's economy is most impressive if viewed in relation to overall figures for the area. For example, Consortium employees constitute 7 percent of Worcester's (92,000) total workforce.

Revenues and the employment they generate are vital statistics in an assessment of economic impact. But they tell only part of the story. Typically, revenues and employment are considered *direct* impacts or benefits. But since most revenues and salaries are spent by Consortium institutions and their employees in and around Worcester, indirect or "spillover" benefits to the community's economy—revenues, salaries and expenditures of the industries and merchants which serve the Consortium, as well as the antecedent businesses serving those firms—amount to far more than the $230 million in revenues realized by Consortium members; thus the $575 million reported in the study's findings.[1]

Often, "impact" studies also explore the consequences of removing the specified contributions from the economy. The Consortium's report, however, makes no

[1] Total impact is measured by applying an economic multiplier—in this case 2.50—to the direct contributions figure.

1981 Economic Impact Statistics*

	1981 Operating Budget	1981 Capital Budget	Faculty/Staff Full Time	Faculty/Staff Part Time	Students Full Time	Students Part Time	Annual Visitors	Capital Expense 1965–1981
Anna Maria College	$ 3,412,904	$1,202,548	64	161	457	1,152	2,600	$ 3,799,548
Assumption College	10,982,000	190,000	179	129	1,550	1,124	10,000	5,060,000
Becker Junior College	4,600,000	350,000	95	35	1,302	150	4,500	7,000,000
Central New England College	3,900,000	350,000	61	110	701	1,125	12,000	4,233,000
Clark University	24,586,000	2,900,000	474	130	2,334	900	20,000	18,700,000
College of the Holy Cross	26,965,000	500,000	670	75	2,510	0	185,000	22,250,000
Quinsigamond Community College	5,163,000	0	190	80	2,266	3,527	10,000	9,623,000
University of Massachusetts Medical Center	111,000,000	1,500,000	2,925	487	442	5,900	83,000	135,000,000
Worcester Polytechnic Institute	31,768,000	2,500,000	504	40	2,457	300	58,000	24,084,323
Worcester State College	7,790,000	0	330	5	2,735	3,130	2,250	14,300,000
Totals	**$230,166,904**	**$9,492,548**	**5,492**	**1,252**	**16,754**	**17,308**	**387,350**	**$244,049,871**

**Institutional data are self-reported.*

mention of these hypothetical events. Nor does it specifically address the indirect effects of expenditures by the more than 34,000 full- and part-time students attending the Consortium institutions.

WPI's operational budget, as reported in the report, was nearly $31 million in 1981–82, or 14 percent of the Consortium's total. Only the budget of the University of Massachusetts Medical Center was larger. In fact, the Center accounted for almost 50 percent of both the Consortium's overall budget and its total employment.

Expenditures for capital goods among Consortium institutions totaled $9.5 million in 1981–82. By comparison, in 1980, the most recent year for which statistics are available, Worcester-area firms invested over $158 million in land and new buildings and equipment. What's more, between 1965 and 1981 Consortium members spent some $244 million for capital items—nearly a quarter of a billion dollars.

But what of the more qualitative impacts of education on the community? John W. Ryan, the Consortium's director, calls the Consortium "a most desirable" member of the community. Few would argue this point. Education is an environmentally clean, labor-intensive industry. The Consortium provides Worcester-area residents with outstanding opportunities for art, music and the humanities. And it offers counsel and assistance to all Worcester citizens through community services and continuing education programs.

Since its inception in 1967, the Worcester Consortium for Higher Education has been recognized throughout the nation as a leading example of cooperation among institutions of higher learning. Cross-registration, free shuttle bus transportation and collaborative academic programs in medicine, engineering, business, law, education and communications distinguish the Consortium arrangement. In addition, the three million volumes housed in the libraries of Consortium institutions serve as a vital community resource.

"And an element that's too often overlooked," says Ryan, "is the contribution in time and effort given by Consortium students, faculty and staff as volunteers and appointed and elected officials at local schools, hospitals and agencies serving the handicapped and aged. These are impacts which don't lend themselves well to econometric analysis, but they are essential to the well-being of the community and the myriad publics which we serve."

—KLM

Winter Sports Update

WPI's star continues to rise on the athletic horizon. Last fall the football team (6–2) and the field hockey team (12–7, sixth in the nation) reached meteoric heights, attaining respect and admiration throughout New England and beyond.

As we went to press, the men's basketball, hockey and wrestling teams were also enjoying sustained successes.

Men's basketball, under the direction of coach Ken Kaufman, got off to the fastest start in the school's 64-year history of the sport. The Engineers won their first five games, including an 88–78 victory over Clark in the finals of the first annual Worcester Four Tournament, hosted by WPI. That opening season streak catapulted the Engineers to the top of the Division III polls, ranking WPI No. 1 in New England and No. 13 in the nation!

But after a spectacular start, the team slipped, losing two of their next three games (one to Springfield, the nation's No. 14 Division II team). However, with a 6–2 record, WPI was still ranked No. 3 in New England and No. 17 in the country.

In statistics, the Engineers are led by six-feet five-inch center Russ Philpot, a sophomore mechanical engineering major from Somerville, Massachusetts. He is averaging 20 points and nine rebounds per game. But as everyone knows, one player doesn't make a team. Four players are averaging double figures, and the team leads the country in offensive output with 89.5 points a game.

"The first part of the season has been very enjoyable," says Kaufman. "We won our first five games, won our own tournament, and we've been included with the best teams in the country. It's gratifying to see WPI receive that kind of notoriety."

The hockey team has not gotten the same national attention, but it has become a dominant force in the newly formed New England Small College Hockey Association. Despite the fact that as a club sport, the WPI hockey team competes against varsity competition, the Engineers are currently enjoying a perfect 9–0 record.

Led by a trio of seniors from Hudson, Massachusetts—right wing Pete Millett, center Jim O'Keefe and defenseman George Oliver—WPI has outscored its opponents by nearly three goals per game.

"We've been blessed with some outstanding talent," says coach Len Bowen, "We have people who can skate, check, handle the puck and score. I don't know if we can continue to win at this pace, but I feel we have one of the best teams in the league."

As expected, WPI's wrestling team is off to another good start. The perennially strong Engineers are right where coach Phil Grebinar expected them to be at this point in the season—4–2 and ranked No. 2 among Division III New England teams. Both losses came at the hands of Division I schools: Harvard (rated No. 1 in New England) and the University of New Hampshire (No. 9).

Russ Philpot (20), WPI's All-New England center, against Clark at Harrington Auditorium.

"We're off to a start similar to past seasons," says Grebinar, whose team finished just 3/4 point out of first place a year ago in the New England College Conference Wrestling Association Championships. "Now we're going into the Division III part of our schedule, and we'll be setting our sights on the best possible dual meet season and a victory in the tournament."

Halfway through the season, the swimming team is 1–3, women's basketball is 3–4, and indoor track is 2–4.

Mark Mandel
Sports Information Director

WPI Engineers Spring 1982 Sports Schedule

DATE	Sport	Opponent	Time
April 2	Golf	Coast Guard Academy at Clark	1:00 p.m.
	Baseball	Bates	3:00 p.m.
3	Baseball	at Wesleyan	2:00 p.m.
	Tennis	Bentley	2:00 p.m.
5	Softball	Assumption	4:00 p.m.
6	Golf	Bentley at Providence	1:30 p.m.
	Baseball	Lowell	3:00 p.m.
7	Softball	at Clark	4:00 p.m.
	Tennis	at Holy Cross	3:00 p.m.
8	Baseball	Clark	3:00 p.m.
	Softball	Coast Guard Academy	4:00 p.m.
9	Golf	Babson/M1T at Babson	12:30 p.m.
10	Baseball	Hartford	2:00 p.m.
	Tennis	at Babson	2:00 p.m.
	Track	Wesleyan/Eastern Connecticut at Wesleyan	1:00 p.m.
12	Softball	at Merrimack	4:00 p.m.
13	Baseball	A.I.C.	3:00 p.m.
	Tennis	at Clark	2:00 p.m.
	Golf	Holy Cross/Assumption at Holy Cross	1:00 p.m.
	Track	Holy Cross/Assumption/Clark/ Worcester State at Holy Cross	
14	J.V. Tennis	at Clark	3:00 p.m.
	Softball	at Nichols	4:00 p.m.
	Baseball	Alvernia	3:00 p.m.
15	Golf	at Mass. State	
16	Track	M.I.T.	4:00 p.m.
	Softball	Anna Maria	4:30 p.m.
	Golf	Clark/Tufts	1:00 p.m.
17	Baseball	Amherst Double-Header	1:00 p.m.
	Tennis	Suffolk	2:00 p.m.
20	Softball	at M.I.T.	4:00 p.m.
	Golf	Lowell	1:00 p.m.
	Tennis	Bates	3:00 p.m.
	Baseball	at Trinity	3:00 p.m.
21	Softball	Stonehill	3:30 p.m.
	Track	at Coast Guard Academy	3:00 p.m.
22	Tennis	Nichols	3:00 p.m.
	Baseball	at Assumption	3:00 p.m.
23–24	Softball	M.A.I.A.W.	
24	Tennis	Assumption	1:00 p.m.
	Baseball	at Coast Guard Academy Double-Header	1:00 p.m.
27	Softball	Bryant	4:00 p.m.
28	Tennis	at Lowell	2:00 p.m.
	Track	at Trinity	3:00 p.m.
29	Softball	Regis	4:00 p.m.
	JV Tennis	Becker at Leicester	3:00 p.m.
	Golf	Springfield	1:00 p.m.
	Baseball	Suffolk	3:30 p.m.
May 1	Track	Tufts/Brandeis	1:00 p.m.
	Softball	Holy Cross Double-Header	10:30 a.m.
	Tennis	at Brandeis	2:00 p.m.
	Baseball	at M.I.T. Double-Header	1:00 p.m.
3	Softball	at Brandeis	4:00 p.m.
	Golf	A.I.C./Nichols	1:00 p.m.
4	Baseball	at Tufts	3:00 p.m.
5	JV Tennis	at Dean JR.	3:30 p.m.
6	Softball	Curry	4:30 p.m.
	Tennis	A.I.C.	3:00 p.m.
7	Baseball	Mass. Maritime	3:00 p.m.
	Golf	at Trinity	1:00 p.m.
8	Softball	Emmanuel Double-Header	10:30 a.m.
10	Baseball	at Bentley	3:00 p.m.
12	Baseball	at Northeastern	4:00 p.m.
14	Baseball	Brandeis	3:00 p.m.

Critical Acclaim for Menides

Marvin Richmond

"A lover of poetry" is how she describes herself. Laura Menides is that and more. She's a noted poetry critic, author of childrens' books, an English Professor in WPI's Humanities Department—and a poet. Two of her recent poems will be published in the forthcoming *Anthology of Womens' Poetry*, the Laurel Press.

Recently, Professor Menides was elected president of the Worcester County Poetry Association. In a recent interview she described the Association as a local group begun 11 years ago in order to sponsor poetry readings and other special events. The Association is sponsored in part by the Massachusetts Council on the Arts and Humanities.

Archibald MacLeish, Donald Hall, Carol Oles and Maxine Kumin, each an internationally recognized poet, have read their work locally through Association sponsorship, as have local poets Fran Quinn, David Barron, Louise Monfredo and Malcolm Parkinson, himself a teacher in WPI's Humanities Department.

In addition, WPI and the Association recently co-sponsored an evening of poetry and music: poems by Emily Dickinson and e.e. cummings set to music by WPI Professor David McKay. Spring programs will include appearances by Carlos and Gloria Fuentes and Czeslaw Milocz.

Commenting on the receptiveness of WPI students to poetry in general, Laura Menides says, "Given a chance—they're very bright people—many get caught up in the poetry, sometimes in spite of themselves.

Besides poetry, Professor Menides teaches advanced essay writing—"today it's typically crisp and breezy, but without neglect for vocabulary;" American literature, her specialty; and Existentialism. Previously she taught at Holy Cross, the University of Chicago, Finch College, and New York University, where she earned her PhD.

Her stories for children have appeared in *Basic Reading*, a Harper and Row publication.

Her favorite poet? T.S. Eliot. "His work is intellectual as well as passionate. It's that combination that attracts me."

—KLM

Cleaning Up the Campus

Is WPI becoming a wasteland of hazardous materials and procedures? Those in the know offer a resounding reply.

By Kenneth L. McDonnell

I sat upon the shore
Fishing, with the plain behind me
Shall I at least set my lands in order?
—T.S. Eliot[1]

"As I recall, I'd been at a New England Patriots game that afternoon. When I returned home I got a call from campus security. 'Better get down here, Al. We've got a leak of something out back of Goddard.' "

The incident, a chemical spill from a 5-gallon barrel, brought Worcester fire fighters, state and federal officials, and curious students rushing to the scene. To the scene also rushed Allan F. Harper, WPI's Business and Academic Technical Services Administrator and member of the Campus Safety Committee (CSC), which for months had been systematically removing chemical wastes from many academic departments. For Harper, the Patriots' win that day quickly lost its shine.

But when the scene had cleared and the panic subsided, Harper's analysis showed that far from being overly hazardous, the spill amounted to no more than three gallons of ethylene glycol—common antifreeze—awaiting pickup and disposal by a contractor licensed by the Environmental Protection Agency (EPA).

It's no secret that WPI—no less than the companies and government agencies for which many of our graduates later work—utilizes chemical substances by the hundreds for education and research. Many of these chemicals EPA calls "hazardous." And, like the private and public organizations that use or manufacture hazardous materials, teaching and research often produce chemical by-products which, again, EPA labels hazardous—in common parlance, *hazardous wastes*.

It is reasonable, then, to probe the hazardous materials situation at WPI as well as the larger issue of safety on campus. These are aspects of the college experience which are demanding ever greater attention by administrators, faculty, students, parents and friends of nearly every academic institution. At WPI, the issue hits especially close to home.

We need to ask questions like:

- To what extent does the quality of the WPI experience depend on the use of hazardous materials and procedures?
- What safeguards are in place to ensure safe acquisition, storage, handling and disposal of chemicals and radioactive materials by students and faculty?
- What is WPI's future with respect to the hazardous materials issue?
- Is WPI becoming a wasteland of hazardous materials?

Chemical waste management has long been an issue of concern at WPI. As early as 1968 the member schools of the Worcester Consortium for Higher Education saw the need for conscientious long-term management of hazardous wastes generated by the member schools. Collectively, they attempted to enlist the good offices of the City of Worcester to designate a site to be used specifically for hazardous waste disposal. The Consortium's cradle-to-grave system would have predated even that of EPA. Unfortunately, the proposal fell on deaf ears at City Hall.

The inception in 1970 of the WPI Plan and its consequent changes in academic requirements boosted the school's handling and generation of hazardous materials. Formerly, a limited number of departments required a senior research project. "But the Plan changed all that," says Harper. "It led to a logarithmic increase in the number of students participating in project work." Conservative estimates indicate that 35 to 40 percent of undergraduates are now engaged in Major Qualifying Projects (MQPs) and Interactive Qualifying Projects (IQPs) at any one time.

Says Dennis J. Lipka, Projects Administrator and CSC chairperson. "That's literally hundreds of projects going on simultaneously, utilizing virtually every piece of equipment on campus." And, as project topics cut more and more across the bounds of academic disciplines and the scope of students' "majors," the potential for exposure to hazardous materials jumps.

This implication of the Plan soon surfaced. Growth in project work was expanding the need for greater varieties and quantities of chemicals on campus. Moreover, as never before, the school was promoting an open-door policy on supervised use of laboratories and workshops. But far from merely *reacting* to the consequences of this shift, WPI's then-president George Hazzard and others recognized that failing to anticipate and influence change, failing to monitor the types and quantities of hazardous materials acquired and generated on campus, might be courting disaster. To avoid this situation, the college instituted a safeguards program based on instruction, supervision, secure storage, and proper disposal.

Today, the safety program looks and works much as it did ten years ago. Its strength lies in the level at which it is directed—professors and staff who work with students. Beyond this, key individuals in

[1] From "The Waste Land" in *Collected Poems 1908–1962* by T.S. Eliot, copyright © 1936 by Harcourt Brace Jovanovich, Inc.; copyright © 1963, 1964 by T.S. Eliot. Reprinted by permission of the publisher

each department are designated to manage any chemical wastes until they can be properly disposed.

Although the focus of project work varies as much as the disciplines involved, the program is based on the following broad guidelines. Prior to beginning any project, each student is counseled in:

- The scope of the project, in detailed terms
- The maximum types and amounts of chemicals to be used as well as appropriate standards for handling and storage
- What to expect should utility services shut down during an experimental procedure
- The proper disposal of all end products
- Other concerns, as called for in each project

Many academic departments have also adopted guidelines for after-normal-hours access to buildings, such as a buddy system and periodic checks by campus police. In addition, unneeded end products can sometimes be utilized by other departments.

Marvin Richmond

"Safety is a state of mind, to be nurtured in all students, faculty and staff."

—Dennis Lipka,
Campus Safety Committee

"As we see it, safety is really a question of risk," says Lipka. "Appropriate risk for one person may not be appropriate for someone else."

As Projects Administrator, Lipka is in an ideal position to observe the magnitude and diversity of MQPs and IQPs proposed, under way and completed. And in dealing with so many students and faculty, he gets a close look at the many elements of safety on campus. Little wonder he was named to head CSC when the committee convened its first meeting last December.

CSC identifies and develops solutions to the broad issues of day-to-day safety and, to some extent, security on campus. These range from responding to random comments from campus and community residents concerning safety; to developing campus-wide policy recommendations on toxic waste management and use of facilities; to encouraging safer working habits among WPI's many constituencies.

"Here's the situation confronting us," says Lipka. "We have in our shops and labs the same types of equipment found in many industrial settings. But often, relatively few incoming undergraduates have extensive experience with this equipment." Plus, projects—IPQs in particular—can require students to use procedures which they may not soon replicate. All this can lead to a potentially hazardous situation. It's the job of CSC to manage this risk. "Short of simply barring use of a lab or workshop, we must try to protect everyone who has access to these and our many other facilities."

That CSC even exists is the result, in part, of the Goddard Hall spill. Before the incident, says Lipka, there had been no real vehicle for addressing specific safety issues as they arose. "Suddenly, we became aware that any number of problems could show their heads, and we found that a variety of safety and security concerns didn't have a home." Issues like these have come before CSC:

- Cases of students working alone in machine shops or laboratories
- Availability of telephone service between labs and campus police
- Updating safety and instructional manuals
- Incorporating WPIC, the campus television system, into a security monitoring unit

Add to these and numerous other concerns the question of security in places like dormitories and public areas, and you begin to realize the magnitude of the issues to be managed.

Lipka points out, however, that normal security is the domain of the Campus Police Department. "Duly appointed and well-trained," he says, "day-to-day security matters reside logically in Stratton Hall."

As Dennis Lipka and Allan Harper will quickly tell you, cooperation is the name of the game in the safety business. But too often, says Anthony Ruksnaitis, Campus Engineer, WPI Safety Officer and CSC member, the campus community has paid little more than lip service to past safety campaigns. In his 25 years at WPI, he's seen safety committees come and go. Usually they've resembled old warriors, he says. They kick up a lot of dust, but in the end are still toothless.

All that may be changing, however. Late in 1981, CSC set out to investigate ambient air lead levels at the Alumni Gymnasium rifle range. The findings of a U.S. Army analysis of the situation confirmed the suspicions of Col. Roger Carney, head of Military Science at WPI: Due to substandard ventilation in the old facility, lead levels in the air—the result of countless bullets being fired—were unacceptably high. Confronted with this situation, CSC faced the first real test of its authority.

The outcome? Following CSC recommendations, the range was closed for two months while lead levels were systematically reduced in accordance with government guidelines. Recalls Lipka, "On this one we expected a real tug of war—people telling us their lungs and blood are *their* business, not ours." However, he says, cooperation couldn't have been better.

But hand-holding is not the role Lipka sees as the best casting for CSC. "Safety starts with the facility users," he believes. "The most effective long-term impact we can have is to make the WPI community more aware of the importance of safety, appreciate the risks that may accompany use of our facilities, and help develop policies for operating safely in this environment." The track record of faculty and technicians, he says, is outstanding, but with students moving through in four-year cycles, ensuring safety and security is an ongoing campaign.

Faced with the fact that the work of many teachers, students and researchers at WPI often requires the use of hazardous *materials*, should we assume that we have a hazardous *waste* problem on our hands?

"The chemicals we use here," says Lipka, "number in the hundreds." WPI has declared itself a generator of hazardous materials and now participates in federal regulations of toxic wastes. "We handle many of the substances to which these

regulations apply, but not in significant volumes."

Theodore C. Crusberg, Associate Professor of Life Sciences, sees things this way: "Our work calls for the use of scores of chemicals. But we don't generate enough chemical wastes—not even close—to qualify under even Massachusetts regulations."

The state guidelines to which Crusberg refers call for generators of over 100 Kgm per month to obtain a state Hazardous Wastes Disposal Permit. Federal regulations call for similar licensing, but the threshold is ten times the state level.

Says Harper, who manages hazardous wastes at WPI, whether or not the college qualifies under the state regulations depends on whether or not Professor Al Weiss of Chemical Engineering is operating his coal degasification project in a given month. When in operation, this project alone puts out more than 100 Kgm of chemical wastes a month.

Prior to obtaining these permits, recalls Harper, the college had decided to measure its chemical wastes. This effort—campuswide collection, identification, labeling and disposal—began in June 1981. The materials outside Goddard Hall, those that leaked from a sun-drenched and thus overheated steel container, were part of that clean-up program. The spill, he says, had an interesting effect on the normally slothlike EPA licensing procedure. Following the Goddard incident, a telephone call from Harper to EPA netted a verbal authorization that WPI had been granted a disposal permit number. But to date, no permit has been received by WPI officials.

Crusberg's policy for handling hazardous materials in his labs is one of caution. Consider, for example, the work done on bacteria. "Our philosophy is to treat everything as a pathogen, more like Escherichia sp. than Salmonella sp." When students are handling any bacteria, an experienced professor or graduate student is always on hand. "And it's a policy we enforce."

Beyond self-management, many projects in Life Sciences are overseen by WPI's Biohazards Safety Committee (BSC), headed by Professor Douglas T. Browne, Associate Professor of Chemistry. Some observers believe, however, that the effectiveness of BSC, a federally established body, may face setbacks due to budget cutting by the Reagan Administration.

While hazardous materials management is a major concern of CSC, management of radioactive materials is an animal of a different breed.

Dr. Raymond Goloskie, Associate Professor of Physics, chairs WPI's Radiation, Health & Safeguards Committee (RHSC). He is also his department's CSC representative. When he holds up NRC-10-CFR20, the four-inch-thick bible of the Nuclear Regulatory Commission (NRC), you get the distinct impression that the NRC means business. It's the job of the four-member RHSC to ensure WPI's compliance with the guidelines so painstakingly detailed in NRC-10-CFR20.

Most use of radioactive materials on campus, he says, takes place in Life Sciences, Physics and, of course, the nuclear reactor. For his part, Professor Goloskie conducts research in intermediate particle physics, a pursuit, he says with tongue in cheek, that helps keep physicists off the street.

According to Goloskie, radiation is "not particularly problematic" at WPI. In fact, he says, a single battery of X-rays exposes an individual to more radiation than WPI's reactor or laboratory procedures possibly can.

But NRC's acceptable radiation levels are very low. Case in point: During a routine inspection in his own lab, the Commission found unacceptable amounts of radioactive dust on ceiling and walls. The problem, explains Goloskie, was the result of a long-term procedure using tritium, the radioactive isotope of hydrogen, where it mixed with dust and adhered to most surfaces in the several rooms of the laboratory. Tritium is not an overly dangerous isotope, and the measured levels of radiation were not great, he says, but NRC's stringent guidelines called for a moratorium on use of the facility while it received a thorough scrubdown.

The work of Crusberg and his associates and students often calls for low-level radioactive isotopes as well. For example, isotopes are an integral part of procedures for labeling certain portions of DNA chains in plants. "The major problem we have with these substances," he says, "is ordering them in small enough quantities to meet our needs." All such substances are stored and labeled in the proper containers, and their use is restricted to a controlled environment in the lab.

A key figure on RHSC is Thomas P. White. He serves as WPI's Radiological Safety Officer (RSO) as well as Nuclear Specialist in Mechanical Engineering. He's also senior operator of WPI's nuclear reactor. As RSO he oversees all procurement, use and disposal of radioactive materials on campus. "That's a lot of responsibility," says Goloskie.

But White seems up to the task. He trained as a nuclear reactor operator aboard a U.S. Navy submarine, before serving as a nuclear quality assurance inspector for Yankee Atomic Electric Company.

NRC, he says, runs a tight ship. "They

Roger Perry

Splitting Atoms. WPI's nuclear reactor is open to the public.

inspect our reactor facilities unannounced, and their guidelines are among the toughest ever devised." But the responsibility for safe operation of nuclear reactors, he adds, really rests with the operator. "In many cases, our own policies are even more strict than those of NRC, but not to the extent that we hamper the process of federal approval of WPI's procurement of radioactive materials."

The heart of the radioactive materials question is most likely the issue of waste disposal. But because of the specific types and amounts of materials on campus, White explains, "We can hardly call disposal a problem." Legally, he says, many radioactive substances can be put down the drain or out in the trash. Sulfur 35, for example, is an isotope used commonly in Life Sciences. But the quantities on hand—only microcuries—and its characteristics—including a half-life of only 86.7 days—allow its users to dispose of it like household garbage. Similarly, though it has a half-life of 5730 years, the quantities of Carbon 14 utilized on campus can be legally disposed of in the same way.

"In fact," says White, "we have a household-sized Sears kitchen compactor at the reactor. If a radioactive substance is spilled somewhere on campus, we compact the cleaning cloths and containers, store the material in steel cylinders, and eventually put it out with the trash." The compactor hasn't been run since 1973.

White acknowledges the controversy surrounding nuclear power. But he believes that while the college prefers a low-profile approach to publicizing the facility, it is in the best interest of both WPI and the public to clarify any misconceptions people may entertain concerning nuclear power. White: "Some people think we heat WPI's swimming pools or light buildings or power the stoves at food service. But on guided tours of the facility—by some 1,000 visitors last year alone—we do out best to dispel such misunderstandings while satisfying people's curiosity." (See box on this page.)

"Low profile" describes the facility itself, a 10 Kw open-pool research reactor. "Ten kilowatts is about the electricity drawn by two pop-up toasters," he says.

Although WPI doesn't offer a degree program in nuclear power, many students as well as faculty use the reactor for project work. For example, MQPs and IQPs often call for examination of materials under the influence of a radioactive field. This procedure provides students with hands-on experience with a reactor, valuable credentials for employment after graduation. Still, utilization of the reactor is relatively light. It operates for only three to four hours per week. Other times, it is completely shut down.

Since it went critical in 1959, the reactor facility has been directed by Dr. Leslie C. Wilbur. The fuel enlisted in 1959, says White, is the same fuel, Uranium 235, you'll find here today, so little has the reactor been used. At today's rate of utilization, this same fuel should last another 300 years. Corrosion of other parts of the reactor will occur long before the need to transport and dispose of any spent fuel. In practical terms, this situation exempts the college from the myriad regulations governing the disposal of nuclear waste.

Today, the facility's license to operate is due to be renewed for another 20 years. But of late, small research reactors like that at WPI have been placed on the back burner at NRC, what with all the attention focusing on Three Mile Island.

But White has every reason to believe that his operation will comply with the Commission's increasingly exacting standards. To be licensed, the operator must demonstrate in a simulated emergency that the reactor can be shut down in 600 milliseconds. Says White, "The grades we've gotten from NRC have always been, let us say, glowing."

Lunch, Anyone?

"Our most popular exhibit," says Thomas P. White, Senior Operator and Nuclear Specialist of WPI's nuclear reactor facility, "could be as close as your own pantry."

In the early 1900s, reports White, various uranium compounds were used to produce brilliant orange-red glazes for ceramic ware. The best-known brand, Fiestaware, was manufactured by the Homer Laughlin China Company of East Liverpool, Ohio, at one time the largest pottery plant in the world. Due to its rugged construction, Fiestaware could be found in countless homes across the country before World War II. But when the war effort placed stringent controls on uranium ores, the company was forced to halt production of the orange-red dishes. The company went out of business in 1973.

Today, Fiestaware is a prized collectable. And because uranium presented certain production problems, the orange-red plates, cups, saucers, etc. are especially valuable.

Official studies make little mention of any risk these ceramics present to their users, because most of the radioactivity emitted is beta particles, and the dose is normally confined to the hands.

But, says White, "We have found that many of these dishes have become worn, which increases the chances of ingestion of some of the glazes." On contact each plate reads about 6 millirems per hour on the Geiger counter. "You can compare this to the 200 or so millirems that members of the general public receive each year—to the entire body—from normal background sources.

"We emphasize to our visitors that these dishes are no longer in production and that today any use of radioactive substances is strictly controlled by the Nuclear Regulatory Commission with the public's safety always in mind."

He recommends that, although no immediate health hazards exist due to Fiestaware, people who use these ceramics—the orange-red colored variety only—might consider replacing them with another color, but not necessarily discarding them. "They are valuable collectors' items," White adds, "but any unnecessary exposure to radiation should be minimized."

"Look at but don't eat from orange Fiestaware dishes," cautions Tom White.

PROJECTS

A review of MQPs, IQPs and research by WPI faculty and visiting professors

Whether at the undergraduate, graduate or faculty level, projects play an integral role in the WPI experience. Projects help individuals learn to evaluate information, identify problems and implement solutions. Mastering this process is marked by growth in experience, self-discipline, resourcefulness and self-confidence. In this and subsequent issues of the Journal *we will feature the projects of several members of the WPI community. We hope you will find these briefs thought-provoking and helpful in the endless process of solving problems in the real world—a process we all share in.*

Hazardous Wastes at Boston Edison: The Impact of Coal Firing

By Michael P. Brousseau, '83, ME; and William J. Thorpe, '83, ME
Prof. K. Keshavan, CE, Advisor

Residual fuel oil is now the nation's most widely used fuel for the generation of electrical power. Since 1970, however, the cost of oil has shot up from $2 to over $30 per barrel, making fuel costs over 50 percent of the total cost of oil-fired electricity generation. Due to this better than fifteen-fold jump in oil prices, many power companies are investigating the relative costs and benefits of alternative fuels. A leading candidate, especially in the Northeast, is coal. Boston Edison is but one of many energy producers considering the switch—in part or entirely—to this cheap and plentiful fuel.

But while coal offers major advantages in cost and availability to producers in New England and elsewhere, the threat of environmental contamination from burning coal can be significantly greater than that from oil firing. Consequently, more elaborate and costly pollution-control measures are necessary to meet current federal, state and local regulations. And as coal replaces oil, the additional disposal costs and site demands also rise. Very soon, coal's luster may begin to fade.

To help Boston Edison evaluate the environmental and economic feasibility of converting its Mystic Station in Everett, Massachusetts, from oil to coal firing, two WPI students are investigating the many facets of this controversial and far-reaching issue. Their interdisciplinary approach includes not only a cost-benefit analysis of alternative pollution-control and waste-disposal technologies, but also a thorough consideration of the regulations pertaining to coal firing.

Coal firing itself can present problems of type as well as degree. It creates three kinds of wastes: bottom ash, or unburned coal; fly ash, minute particles drawn into the atmosphere by exhaust gases; and scrubber sludge, a precipitate of calcium sulfate or calcium sulfite resulting from the processing of flue gases before they leave the plant. Fly ash and bottom ash are common to both oil- and coal-burning processes, but coal produces much greater amounts of this by-product than oil.

Collecting and disposing of coal-fired by-products would not be so costly if one technique could accommodate all three wastes. Unfortunately, this is not the case. On top of all this, current regulations dictate with amazing specificity what processes can be used to dispose of each type of waste.

Taken together, the problem facing Boston Edison and Brousseau and Thorpe can be structured as a three-by-three matrix, where waste collection, processing and disposal each impact upon and are influenced by economic, technological and regulatory issues.

Untangling this web of confounding variables requires a solid grounding in each element of the matrix. The project will incorporate close communication between WPI and Boston Edison, with a thorough analysis of waste amounts generated, collection and disposal techniques and locations available, the short- and long-term economic and environmental impacts of each alternative, and the nuances of the Resource Conservation and Recovery Act. Finally, Brousseau and Thorpe will present their findings and recommendations to Boston Edison.

Monitoring Hazardous Wastes in Woburn

By John F. Paladino, '83, EE; John Summers, '83, ME; and Michael Treglia, '83, CE
Prof. Malcolm FitzPatrick, CE, and Prof. Richard V. Olsen, Mathematical Sciences, Advisors

In its formative years, Woburn, Massachusetts, grew rapidly as a center for industry and commerce, due largely to the completion in 1803 of the Middlesex Canal, connecting Lowell with Boston. Woburn sat at the midpoint of this waterway. Easy access to the Boston and Maine Railroad also contributed to the town's growth.

The next century was to see chemical and tanning firms lead Woburn's economic expansion. But it was not until the end of the nineteenth century that the federal government acted to regulate the growing volume and diversity of industrial waste products. For many years the Refuse Act of 1899 provided for permits for the burial of, for example, animal hides and tanning chemicals. Conventional wisdom at the time had it that industrial by-products thus disposed would simply decompose and be acted upon by the good earth's natural filtration.

But as business and populations grew in Woburn and countless other eastern industrial cities, so too did industrial wastes. The legacy of this growth and the realization that early disposal methods were pitifully inadequate are only now beginning to surface.

In fact, in 1979 the EPA ordered two of Woburn's supplies of drinking water closed due to trace amounts of carcinogenic substances found in them. And not

long ago, toxic materials containing arsenic and lead were found in a lagoon near the old Merimac Chemical Company site.

Recognizing the potential for repeated, perhaps even more insidious scenarios throughout the nation, WPI students John Paladino, John Summers and Michael Treglia decided to respond with some strong medicine. Currently they are developing a practical method for tracking the production, transportation and disposal of hazardous wastes in Woburn. They intend to apply this model to the problems of other communities.

The WPI model utilizes the Standard Industrial Classification (SIC) system to categorize potential and known hazardous waste producing industries and specific firms therein. Interviews, investigations of company records, and on-site inspections will yield a list of industries and companies by SIC code which generate regulated amounts of hazardous wastes.

After further case-by-case analysis, the model will enable investigators to identify systematically, quickly and accurately the factors which distinguish known from merely potential producers. In the end, the WPI team believes the model will enhance regulatory activities by providing an effective tracking method at minimal cost to government—and to the public.

Ocean Waste Disposal in the New York Bight

By Stephen M. LaFrance, '83 CE
Prof. Malcolm FitzPatrick, Advisor

For nearly 100 years the principal means of disposing of New York City's wastes has been ocean dumping. Each year an estimated 1.2×10^7 cubic meters of municipal wastes, sewage sludge, dredge spoils and acid wastes are dumped at sea. Only recently have the environmental implications of ocean waste disposal begun to emerge.

The area of ocean known as the New York Bight—roughly the sea from Montauk Point, Long Island, to Cape May, New Jersey—is one of the nation's most important coastal regions. The Bight not only contains vital shipping routes and major fishing banks; it also provides boating, recreational fishing, beaches and swimming waters for 20 million people.

One more point about the Bight: It, and specifically its 2,500 square mile northwestern corner near the City,—the apex—contains the designated dumpsites for the whole of New York City.

There's more. On top of New York's waste dumping in this area is added sewage from outfalls and heavy shipping traffic. But these dumpings are difficult to monitor, and little baseline data exist on aquatic life and water quality. Hence determining the short- and long-term effects of heavy metals, coliform bacteria and other chemicals and toxins—the more hazardous elements of dumpings—has been effectively frustrated. But the impacts of these materials continue unabated: drastic reductions in photosynthetic productivity, detrimental increases in nitrogen and phosphate, lower oxygen content of the water, wholesale death to ocean and possibly land life of all kinds.

Last summer, WPI's Stephen LaFrance set out to build a body of knowledge on the effects of ocean dumping on the Bight. From aboard the research vessel *Westward*, operated by the Sea Education Association of Woods Hole, Massachusetts, LaFrance collected water samples to test for concentrations of copper, various nutrients, dissolved oxygen, turbidity and coliform bacteria. His findings, which agree with those of other researchers, revealed that ocean dumping has made a significant contribution to ocean pollution in the apex of the Bight. How far beyond the apex these effects are felt was not within the scope of this project.

LaFrance also compiled data on the environmental impact, cost and technological feasibility of alternative disposal methods. Land filling, incineration, composting and land spreading were the options evaluated. As might be expected, tradeoffs among these techniques can be enormous, not only economically and environmentally, but politically and emotionally as well. Presently, the several land-based disposal options appear to be promising. But considering the premium placed on land in and around New York, it is difficult to consider these as serious alternatives.

Authorities expect New York's wastes to triple by the year 2000. Hence the corroborating findings of LaFrance and others like him make New York's waste disposal decision only slightly less wrenching. Nevertheless, as he plot thickens, it is this type of research that will enable decision makers to cast prudent, cost-effective regulatory policies—policies which may impact upon aquatic and land populations far from the Big Apple.

Student projects—MQPs and IQPs—can lead to new and exiciting endeavors.

CASE IN POINT

Toxic Wastes in Massachusetts: The View of One Citizen-Engineer

By John R. Mortarelli, '79, MS, BE

An honest solution to the toxic waste disposal problem should not jeopardize the pristine lands left in this or any other state. But in Massachusetts, legislation on the books does not adequately address this concern. As a biomedical engineer and Massachusetts resident, I am deeply concerned about the state's ability, through its regulatory agencies, to guarantee effective and appropriate safeguards for the health and well-being of its citizens.

As a state, our solution to hazardous wastes must tackle the issue at its roots, at the source of generation. This means discouraging unnecessary production of toxic materials. Today, however, we have no enforceable "carrot and stick" legislation to induce industry to alter production methods and materials to include less- or non-toxic materials.

Still, in a statewide environmental impact report released in 1981, the Massachusetts Department of Environmental Management (DEM) predicted that a 50 percent reduction in the generation of hazardous wastes could be achieved in ten years. In fact, some industries were reported promising to reduce such wastes by 80 percent in that time. But in the absence of effective financial incentives, is it reasonable to expect achievement of these goals? Incorporating disposal costs into the market prices of products is one solution, and an approach suggested by the Environmental Protection Agency (EPA).

Whatever the solution to toxic waste disposal, it should embrace only those technologies which are at the outset deemed most safe rather than least costly. For to "treat" a waste is not necessarily to detoxify it. Consider, for example, solar evaporation, a relatively inexpensive procedure that greatly reduces the volume of a material, but which also allows the volatile components of the waste to be evaporated into the atmosphere. The remaining sludge has been treated but may well be more toxic following, rather than prior to, disposal processing.

Toxic waste facilities have never been good neighbors. As recently as September 1981, the General Accounting Office released a report evaluating the performance of hazardous waste facilities operating under EPA interim status. The report concluded that interim status, under

which Massachusetts has disposed of its toxic wastes since 1980, ". . . cannot reasonably be expected to provide the general public with necessary health and environmental assurances." But when state officials conducted similar inspections, they did not identify as serious problems such items as leaking drums, storage of incompatible wastes, or containers stored without leachate collection systems.

In effect, then, the Massachusetts Hazardous Waste Siting Law (MGL-21D) puts the fox in charge of the hen house. It assumes that a hazardous waste industry allowed to compete in a free market economy is presently endowed with sufficient expertise and adequate technologies to dispose properly of hazardous wastes. Operating under this premise, the legislation encourages industry to site anywhere in the state.

What's more, MGL-21D does not mandate that only enough facilities be created to match projected Massachusetts off-site disposal needs. To date, three companies have been granted "feasible and deserving" status as developers of toxic waste treatment centers. But a brief look at waste magnitudes generated nationally should raise a bright red flag. Of the nearly 40 million dry metric tons of toxic wastes generated in the United States annually, some 60 percent is produced by only ten states. Not one of these is a state in New England.

If a substantial hazardous waste industry develops in Massachusetts, more than likely it will process great amounts of materials generated well beyond our borders. In fact, the rotary kiln incinerator proposed by one of these "deserving" developers will operate with a nominal feed stock of about 15 tons per hour. This is an amount so large relative to our projected needs, that for every ten barrels incinerated, roughly nine must come from out of state. What's more, the firm's notification of intent (NOI) states that it is proposing a *de facto* regional facility.

Obviously, nobody wants a toxic waste facility in his/her backyard. But is Massachusetts, New England's most populous state, the best site for one? Is this the most appropriate place to build a $100 million plant, the largest in the nation, when we produce so little of the wastes that would be needed to make this operation cost-effective? Do we want to handle 300,000 to 400,000 tons of hazardous wastes a year, being fed by a convoy of 100 to 200 trucks a day traveling over rural roads?

Our state is sometimes referred to in jest as Taxachusetts. Would the joke be less biting if we were known as Toxachusetts? Because toxic waste management is so controversial an issue, a politically expedient solution is at least as likely as a well-conceived, prudently engineered one, especially in an election year. But in our eagerness to do what is right and just, we must guard against taking an irreversible plunge into a toxic waste water stream without a sufficiently buoyant legislative lifejacket.

Case in Point is *a forum for discussion; therefore its contents do not necessarily reflect the views of Worcester Polytechnic or the staff of* The WPI Journal. *Please write.*

Midnight dumping is not the heart of the problem. Dealing with hazardous wastes is tougher than catching the outlaws.

HAZARDOUS WASTES

By James C. Wood

United States industries generate many millions of tons of waste each year—slag, ash, scrap ore, solvents, paper, and what have you. Of this total, some 10 to 15 per cent is hazardous—poisonous, carcinogenic, inflammable, reactive, or corrosive. In 1980, according to the Environmental Protection Agency (EPA), hazardous wastes came to at least 57 million wet metric tons.

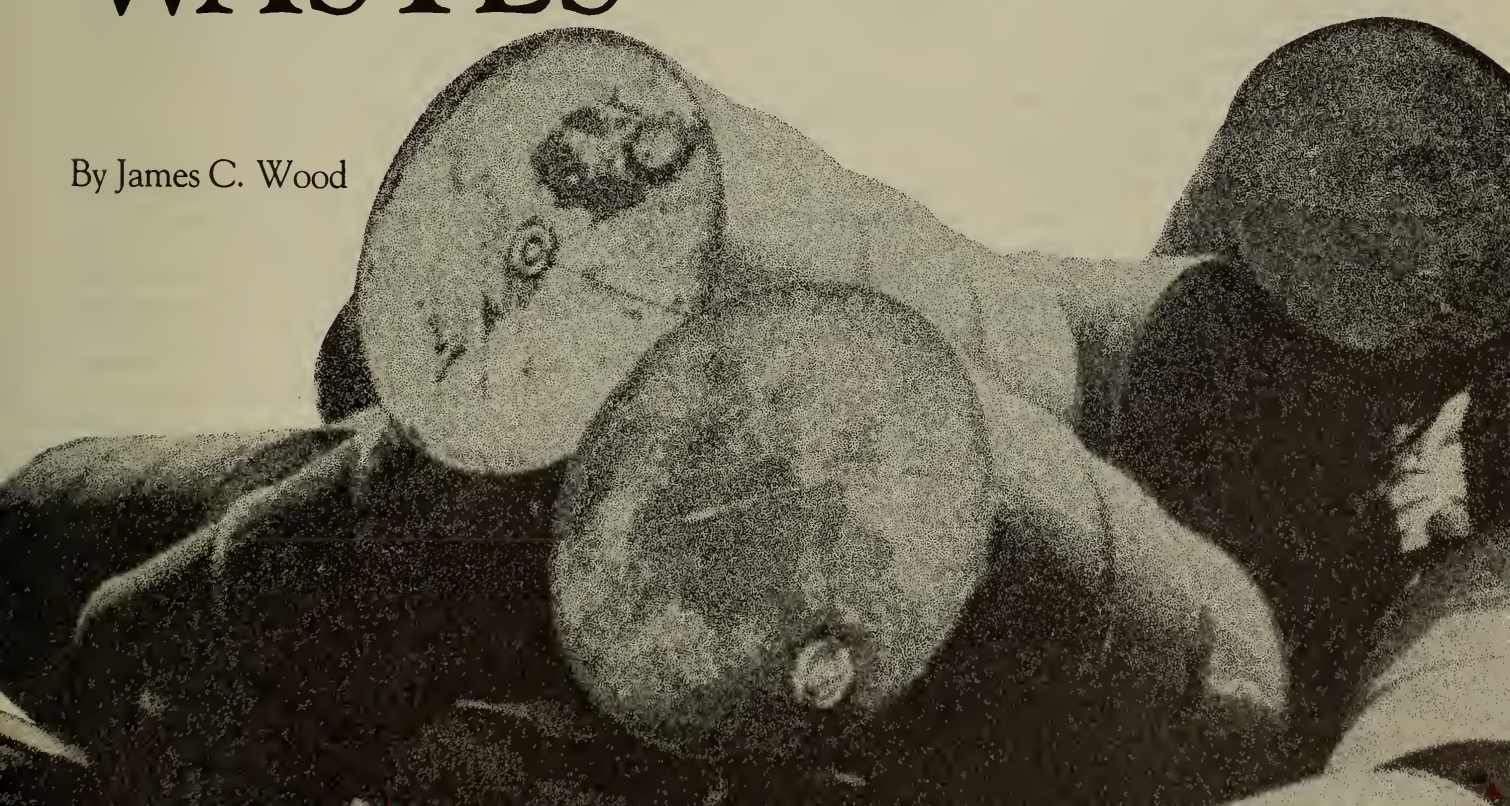
Most commonly the materials are dumped or buried. Some are in landfills approved by local health departments, some in "temporary storage" in 55-gallon drums, and some dumped by the wayside.

Hazardous wastes are not necessarily exotic substances. They are often an integral part of industries producing items that we use every day, such as cellophane, chrome coatings, leather goods, newspapers, ice cream and asphalt. Such products—and their wastes—are obviously a permanent part of modern living. What is to be done about them?

Ambiguity is the operative word. It is uncertain how much hazardous waste is in fact generated. That 57 million metric tons is a brave guess, but only a guess. Under EPA regulations that came into effect in November 1980, all hazardous wastes must be tracked "cradle-to-grave" by a system of manifests, which is supposed to ensure that all wastes go to appropriate sites. Manifests work much like shipping receipts, copies of which wind up at state agencies. But not all states have enforced uniform reporting procedures: Maryland, for example, began a manifest system in 1977, while New York State did not require manifests until January 1982 and Virginia has no system of manifests.

Even in states with such systems, manifests are not required for material that stays on-site, often in a "pit, pond, or lagoon" near the factory. If the pit or pond is deeper than it is wide, it is called an injection well. Nobody knows how much waste is in pits, ponds, lagoons, or injection wells, or what it is, or how serious a problem it will create, if any. Some of it has been there for years, on abandoned industrial properties, and nobody even knows it's there. Old dumpsites can look innocuous, a bit of bumpy ground overgrown with grass.

Also, even the most accurate counts on toxic wastes do not account for all environmental toxins. Such things as Drāno, gasoline, motor oil, road salt, nitrates from fertilizers, and trichloroethylene (a degreaser that is still sometimes used to unclog septic tanks): all these find their way into groundwater and drinking supplies, not because someone is directly disposing of them but via normal runoff, leakage,



and household use. Exposure is critical, for toxic chemicals are no threat to biota or human populations unless there is opportunity for direct contact.

How might that contact occur? Toxic chemicals can move to the surface if a disposal trench is flooded, in which case exposure could occur through direct physical contact. Some hazardous wastes are volatile, and nearby people and animals might breathe contaminated air. Or the wind can stir up dust and fumes from a landfill. These airborne particles could settle out nearby and accumulate in the soil and food chain. If the disposal site is located near a stream or pond, an accident or spill could contaminate the water—perhaps a source of water supply. Or perhaps the dumpsite percolates all too well, like an old gravel pit. In that case, contamination of groundwater would be the major long-term exposure route. The potential health damage would result from drinking contaminated water.

Exposure then requires a pathway and a population. Given these two conditions, the effects would depend on the concentration of the toxic material at the point of exposure.

Aerial view of a licensed landfill: At Maryland's Solley Road dump, waste haulers hand over manifests before dumping their hazardous cargo in the site's active portion (upper left). Trees buffer the dump from nearby neighborhoods. Note the clay cap on the older landfill (lower right). Rising 40 feet, it keeps moisture from entering the landfill. Nothing will grow on the cap until a layer of topsoil is added.

Of all these possibilities, contaminated groundwater is in some ways the worst possible case, because it is so intractable.

Groundwater is one part of the earth's water circulatory system—the hydrologic cycle—and can be thought of crudely as underground conduits and reservoirs. It occurs in the void spaces between subsurface particles. Groundwater moves slowly under pressure until it reemerges at the surface in springs or through discharge to rivers and streams. From place to place, both pressure and the underground materials vary widely. Clay, for instance, consists of extremely small particles which leave very little room for water; clay is virtually impermeable. In gravel, on the other hand, groundwater moves extremely fast. In rock it moves at speeds varying with the type and geologic structure of the rock, varying again with pressure.

An aquifer is any subsurface formation that yields significant amounts of water to wells and springs. Aquifers are not self-contained, like tanks of water held underground; rather, groundwater moves in and out of aquifers, and between aquifers, by complex routes.

Approximately 50 per cent of all U.S. residents rely on aquifers as their primary source of drinking water—more so, naturally, in rural areas where wells are still used. But many urban communities also depend on aquifers. Some regions of the country have *no* alternative water source. Long Island's 2.5 million residents get all their water from three aquifers.

Once contaminants enter an aquifer they may remain for long periods of time—decades to geologic time. Conditions vary, but groundwater may move from one to 100 feet a year, carrying the contamination with it.

Treatment methods, still crude, consist of pumping out and filtering the contaminated water, or simply of pumping until the measured concentration of contaminants reaches lower levels. For example, when two water supply wells in Pennsylvania showed contamination from chromium (VI) in concentrations at .35 milligrams per liter, it was necessary to pump half a million gallons each day for two and a half years. That brought contaminant levels below .02 milligrams per liter.

In a more expensive form of cleanup, however, a waste treatment facility must be constructed at the site. The pumped-up liquid is filtered through activated carbon, which removes organic contaminants. Such an effort is extremely expensive and is normally avoided by closing the wells. In such a case the pollutant plume will remain in the aquifer, moving invisibly underground. It may possibly contaminate other, deeper aquifers or may discharge into streams and rivers.

Although the best solution is difficult to identify, it is possible to characterize the alternatives, which are not simple. For example, the Allied Chemical Company in Baltimore generates over 100,000 tons a year of chrome ore sludge, classified as a hazardous substance because it contains 1.3 per cent by weight of chromium (VI)—chromium in its positive six-valence state, which seems to be associated with cancer and renal damage.

The chrome ore sludge is the residue from extraction of elemental chromium from chromite. The dry sludge is a black, granular material with the consistency of sand. It is non-burnable, so incineration is not possible. Additional processing to extract the chromium (VI) residue offers little promise, which is the very reason Allied considers the sludge a waste and is willing to pay for disposal. Is there a process that will solidify, stabilize, and encapsulate the solid material so that the hexavalent chromium won't leach out? There are claims of such techniques.

However, at a Maryland Environmental Service Laboratory, lab workers have tested samples that were "encapsulated" and "stabilized" by various methods, and they have been unable to confirm that any technique really works. The samples rest in rows of glass containers that had been filled with distilled water; the water has now turned yellow, showing the presence of chromium (VI) ion in solution.

Another alternative is to produce less waste. Allied Chemical is now changing its production process to a form that should reduce the annual waste by over a third. The most radical alternative is to *eliminate* or restrict the use of chromium—the less ore is processed, the less waste. But consider the consequences: chromium imparts heat and corrosion resistance to stainless steels, plumbing, hardware, and metal trim. Could we do without it?

This example illustrates all four major alternatives to land disposal: resource recovery, incineration, physical or chemical treatment, and source reduction. And in this example, we are left with an irreducible minimum of material that must be disposed of on land. Although new technologies are being developed, this disconcerting answer generally holds true.

Physical or chemical treatment: Stabilization is a treatment often advocated for wastes like mixed heavy metal sludges, which contain concentrations of zinc, chromium, lead, or copper sufficient to make them hazardous wastes. (Especially hazardous because heavy metals accumulate in body tissues.) The sludges are in a sense already solidified: they often result from treatment of liquid waste, required under clean water regulations. There are ways to "mine" sludges and extract the small concentration of metals remaining, but for sludges with multiple contaminants such processes remain at the laboratory stage. Solidification involves mixing the materials with cement or ash or other materials to make them more solid, which slows down the leaching process when wastes encounter water. However, the effect is not permanent. It merely delays the eventual escape of leachate. Normally, stabilization makes the material both heavier and more bulky, and it must still be disposed of on land.

Chemical detoxification treatments for wastes include oxidation, precipitation, and acid neutralization. For example, through an oxidation reaction, adding bleach to liquid cyanide solution yields nitrogen, carbon dioxide, and a sodium chloride salt—all harmless. Heavy metals can be precipitated out of cleaning waters. Acids can sometimes be neutralized (although the result may still be toxic). These techniques are already widely used in industry; major companies normally treat vast quantities of chemical waste on site, so that it never enters calculations on toxic waste.

Resource recovery: In some cases, wastes generated by one firm might be useful to another in lieu of virgin chemicals. As Rensselaer Polytechnic Institute engineer William Shuster cautions, however, "Only specific waste streams are candidates for resource recovery." Among these are spent acids, solvents, and dilute solutions of heavy metals.

Sometimes material can be directly recovered. For example solvents become wastes only because they have been contaminated; if the contaminant can be removed, the solvent is ready for use again. Nitric acid wastes, a by-product of etching silicon wafers in the electronics industry, can be neutralized and detoxified with lime to produce calcium nitrate, a high-grade liquid fertilizer.

Resource recovery is not always more costly than landfilling, nor does it require new techniques. But most industry observers believe that the best of such opportunities have already been realized, at least within particular industries. Between industrial groups, the problem is that Firm A rarely knows what uses its waste could have for Firm B. An experimental waste exchange clearinghouse in the San Francisco Bay area has been successful, however, and New York State's plan for centralized treatment and recovery should increase such opportunities.

Incineration: The alternative that raises the most passion is high-temperature incineration, burning at 600–800°C. It is commonly thought that perhaps all wastes should be burned. Why not just get rid of them? Why leave them around in a landfill for future generations to worry about? High temperature incineration breaks apart toxic organic hydrocarbons into harmless substances. Incineration reduces the amount of wastes we have to dispose of. This seems to be the way to go, people often think.

A closer look indicates some problems. For one, not everything burns. Solvents burn well. But waste oils, which would appear to be good candidates, pose a problem: one reason they are hazardous substances is that they are contaminated with trace metals—and metals, of course, do not burn.

Incineration can be extremely expensive: the EPA estimates that the process can cost from $75 to $2,000 a ton. Why the variation? Costs vary with fuel costs and air pollution control costs. Burning material with low energy content means much higher fuel consumption. And some materials require a more elaborate "scrubber" system to ensure that no toxic gases escape. (Scrubbing itself generates a sludge, which is a hazardous waste that will require land disposal.) Perhaps most important, the method is not foolproof. If incineration is incomplete, toxic gas can escape.

At our present state of technology, there is no single recovery method that works for an entire class of wastes, far less for all wastes. Alternative methods can reduce the burden on landfill, but for the foreseeable future they cannot eliminate it. Landfill, then, becomes a topic of some urgency.

In 1972 a municipal landfill, licensed to receive septic tank wastes and sewage sludge, opened in Jackson Township, New Jersey. By 1976 residents of the surrounding community (four square miles) complained of foul-smelling and bad-tasting water. Some people got rashes after they showered.

Most homes drew water from shallow wells, 30 to 50 feet deep. After testing by the New Jersey Department of Public Health found heavy metals and organic hydrocarbons at levels that violated state drinking water criteria, the state ordered the community to close its wells.

A hydrogeologic analysis shows that the Jackson dumpsite rests on sandy, highly permeable soil. Moisture in the form of runoff or precipitation can enter the site and move through the toxic chemicals, dissolving and carrying off hazardous residues. The contaminated liquid, also called leachate, then moved easily through the porous soil into the shallow aquifer that gave the community its drinking water. At Jackson Township, no cleanup is under way. The community now gets water from a well into a deeper aquifer, while the contaminant plume remains, moving slowly through the groundwater.

Contamination of groundwater is not the only risk from improper hazardous waste disposal. At Love Canal contaminated fluids moved to the surface, then sidled into the basements of homes bordering the site. Soil condition reports from the site show that the top 1.2 to 1.8 meters of soil consist of relatively permeable silt and sand, the next 9 to 12 meters of relatively impermeable clay. Migration occurred through the soil's top layer. People living nearby were exposed either through physical contact with surface chemicals, or when volatile organics were present in the basement air of affected homes.

Love Canal is perhaps the most celebrated case of improper handling of chemical wastes. In 1953, one year after Hooker Chemical Company ceased dumping chemical wastes into the abandoned canal, construction began on an elementary school at the site's border. (Hooker argued against the plan, and sold the land to the school board for one dollar only after it became clear that otherwise the site would be condemned and acquired anyway.) During construction, the dumpsite's clay cap, important in containing the wastes, was disturbed. Soon a suburban community surrounded the old canal.

All seemed well for more than 20 years, but in 1977, after a series of heavy rains, residents began to complain of strange and pungent smells in their basements, and of a high rate of cancer, birth defects, and general malaise. The New York State Department of Health investigated and declared the site an "environmental disaster." Residents were evacuated.

Spurred by the atmosphere of emergency, a number of groups began studies to document health damage, but in the flurry the truth seems to have fallen between the cracks. An EPA-sponsored study, for example, claimed to show genetic damage but sparked immediate controversy. Not all cytogeneticists agreed that the data proved chromosome breaks. And even if the original interpretation was correct, it was not clear that there were more breaks than "normal"; there was no control group; measles can cause chromosomal breaks, too. These objections proved well-founded.

There were other epidemiological studies, testing for excess risks of cancer. To date, even well-controlled studies have been unable to prove that exposure to chemicals at the dumpsite has definitely damaged the health of any former residents. Meanwhile, many of the former residents of Love Canal have become so demoralized and disgusted that they will no longer participate in medical studies. So monitoring for long-term effects—such as cancer—will be difficult if not impossible. Residents still do not know what health effects they may face in the future, and the studies did not diminish public concern, but rather increased it.

Franklin and Marshall College

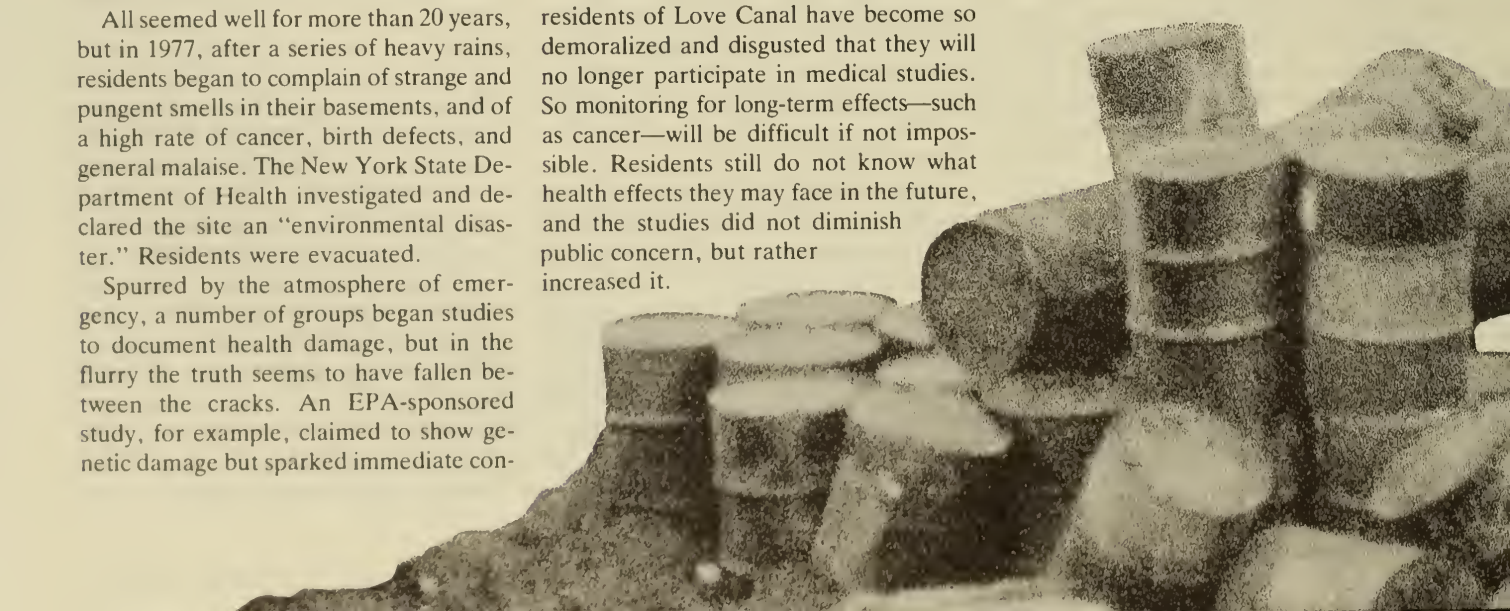
Edward Beutner, a Franklin and Marshall College geologist, belongs to a citizens' committee in Pennsylvania formed to keep an eye on a firm's plans for a hazardous wastes landfill.

In 1980 the Tennessee Department of Public Health approached environmental scientists at the Johns Hopkins School of Hygiene and Public Health with an urgent request: Residents of a Memphis neighborhood feared the health effects of living near an abandoned chemical landfill, the North Hollywood dump—one contaminated with pesticides. Could Hopkins design a valid study to determine the actual health risks? The Hopkins group, aware of deficiencies in the Love Canal health studies, wanted to draft an approach that recognized the immediate concerns of the community, while also establishing groundwork for identifying long-term health effects.

The Velsicol Chemical Company had used a parcel of land in North Hollywood to dispose of pesticide manufacturing residues. People in the neighborhood, a black working-class community, had lived by the dumpsite for years, unaware of potential health risks. Yet EPA environmental sampling at the site has located more than 20 priority pollutants, principally chlorinated hydrocarbons and heavy metals, at concentrations of more than 10 parts per million. Identified chemicals include chlordane, heptachlor, and endrin. All have recognized toxic effects.

These toxic substances were found in surface soil samples, in water from the Wolf River which flows along one edge of the site, and in several ponds on the dumpsite property. However, EPA sampling did not provide enough detail to tell the team exactly how the substances migrated from the site. Who was exposed? Did sampling detect all potentially harmful substances? What was the most likely exposure route?

Identifying health effects can be difficult, even if you know for sure what's in the site. There were no records kept at North Hollywood dump, so the team didn't



know everything buried there. Even if the site could be meticulously mapped, project head Morton Corn says, "There is still the question of exposure. Once you know what's on the lot, you need to know what's getting off. That requires an intimate knowledge of the possible pathways of every chemical dumped."

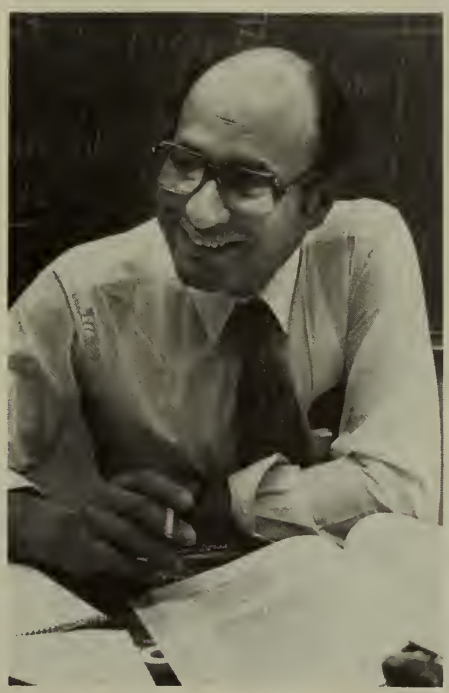
Yet complete knowledge of the way chemicals moved off the site would not eliminate the problem of detecting exposed individuals. For instance, chlorinated hydrocarbons such as chlordane were found, which are likely to cause liver dysfunction if ingested. A blood test for certain liver enzymes should therefore indicate exposure to the dump. "Anything you measure, though, is likely to show up in *some* of the people," says Allen Kimball, a Hopkins biostatistician. The residents could have been exposed to chlordane someplace else; the question is whether any damage that shows up is related specifically to the dump.

And what about people who have moved away, or people who have recently moved into the area? Should they be included in the study, and if so, how? It's nearly impossible to reconstruct a neighborhood as it has existed for 20 years or more, but without such perspective, it's unlikely that the long-term effects of chemicals can be spotted.

And, as with any epidemiological study, a control group is needed. Memphis is a chemical manufacturing center, and aerial photos have revealed 200 to 300 industrial disposal sites, some 40 to 60 of which may contain toxic chemicals. So the chances of finding an unexposed population are slim. But without such a control group, statisticians cannot satisfy themselves that there are more miscarriages, or bad livers, or cancers, or birth defects among people who live near the North Hollywood dump than are "normal" for Memphis residents of comparable age, class, and racial mix.

Whatever the city of Memphis decides to do, the Hopkins effort has highlighted the difficulties of dealing with toxic chemicals. The group has designed a study with a well-defined goal, to see if people living within a certain distance of the North Hollywood dump show specific signs of exposure to chemicals: elevated tissue levels of chlorinated hydrocarbon pesticides and heavy metals, or higher frequencies of certain illnesses linked with those chemicals. The report recommends using questionnaires, physical examinations, and lab tests; and the study would cost at least $3 million. Whether or not it will be carried out, or by whom, has not yet been decided by authorities in Memphis. Meanwhile, Velsicol has come in and covered the site with a few inches of dirt, which has helped alleviate community concern.

James C. Wood is a doctoral student in the Department of Geography and Environmental Engineering at the Johns Hopkins G.W.C. Whiting School of Engineering.



William Denison

Morton Corn, of the Johns Hopkins School of Hygiene and Public Health, directed a study designed to assess health risks in a neighborhood near an abandoned pesticide dump in Memphis.

Future safe management of toxic wastes depends upon well-selected, well-designed, and well-built landfill sites—and on effective monitoring of engineered containment systems. To begin at the beginning, planners must consider a site's geological features, features which predict whether and how wastes will move from a landfill.

The permeability of underlying soil strata measures the earth's capacity to transmit fluids; low permeability, like that found in clay-rich soils, is desirable. Yet the Jackson Township municipal dumpsite, for example, rests on porous sandy soil that does little to halt the flow of leachate.

A site also should have little potential for surface water penetration. The North Hollywood landfill in Memphis, nevertheless, lies in the flood plain of the Wolf River. Dumpsites are often placed on such marginal land—parcels no one wanted.

The location and movement of groundwater are other considerations. To protect aquifers, groundwater should be very low beneath the site, and the "travel time" for polluting fluids to reach an aquifer should be very long. Predicting travel times depends somewhat on the nature of the wastes. For example, heavy metal and acid wastes are sometimes buried together. The acids can lower the natural pH of the soil; unfortunately, the more acid the soil, the more mobile the heavy metal. Certain organic substances, such as trichloroethylene (a solvent and a carcinogen), seem to move very quickly through the soil.

An ideal site is hard to find. Local geological conditions can vary considerably over short distances—even feet. Within a region of low permeability clay, pockets and fissures of sand or gravel can act like an escape chute for leachate, giving it an ideal passage to deep groundwater. These cracks or lenses are not unusual.

Perhaps a more fundamental problem is unavoidable conflict among objects which individually appear quite reasonable. To reduce chances of exposing residents near disposal sites, an environmental planner would favor a remote location, one unlikely to be subject to development pressures. (At Love Canal developers began to build houses adjacent to the disposal trench only three years after the dumping had stopped.) Yet residents near remote sites are also more likely to depend on groundwater as a sole source for drinking water. Locating landfills away from urban areas means that trucks carrying the waste have farther to travel, increasing the chances of spills or accidents.

The ideal site being rare, landfills must be engineered to overcome local imperfections. The engineer's objective is "total containment," with two essential components: (1) prevent the flow of moisture, whether rainfall or surface water penetration, into the landfill proper and (2) collect and treat any leachate that does develop before it escapes.

Such a secure landfill system includes an impermeable cap or cover; an artificial lining at the landfill's base; an underground drainage system that collects leachate; and a pumping and storage system for collecting and evaluating leachate. It works something like a covered bathtub. Within the basin, the leachate collection system drains off any contaminated water and keeps it from moving off site. Leachate collects in holding tanks, and is analyzed and treated.

What can go wrong? In effect, the con-

tainment can work all too well. The landfill cover, though in theory impermeable, will allow moisture to enter the "tub." (Over time environmental stresses such as plant growth and freeze-thaw cycles will open more cracks in the cover.) If the drain clogs, excess moisture can fill the trench and move upward, much like water overflowing a bathtub. The phenomenon is so common that environmental engineers have a name for it—the "bathtub effect." That is what happened at Love Canal. The native clay soil at the base of the trench kept leachate from moving into deep groundwater—but at some cost. When water got into the trench, wastes had no place to go but up toward the surface.

Evidence from the past is not reassuring. Once wastes are buried and out of sight it is too easy to forget that they are around. Yet land disposal does not end when the landfill is capped. The site must be monitored, to make sure no waste moves off site. Someone must ensure that the drainage and treatment systems in the ground continue to work. Who will pay?

Proposed federal regulations require landfill operators to purchase insurance sufficient to maintain leachate collection plumbing and monitor wells for 30 years after closure. But EPA acknowledges that hazardous waste landfills will need "perpetual" monitoring. Perpetuity is a long time. The technology for containing wastes in a secure landfill may not be an insurmountable problem. However, the long-term institutional commitment from state, local, and federal governments may be more difficult to secure.

Industries continue to produce hazardous wastes, and the nation is exhausting the present land disposal facilities. Where will the necessary new facilities go? What communities will accept such feared and unwanted neighbors? "No one wants toxic wastes dumped in his backyard," says Franklin and Marshall College professor Marvin Kauffman.

Conflicts are emerging that reflect the national problem of adjusting to the lesson of Love Canal. The public interest inevitably conflicts with local fears. Browning-Ferris Industries (BFI), for instance, operates a hazardous waste landfill on a 53-acre site in Anne Arundel County, Maryland. In November 1981, the company announced its plan to buy an adjoining 200-acre lot for expansion. Two community meetings organized to protest this proposal attracted more than 600 residents of the surrounding communities of Cadillac, Point Pleasant, Marley, Suburbia, Country Club, and Twin Coves.

The dumpsite, known in the area as the Solley Road landfill, has been open since 1963. In 1977 the State Department of Natural Resources gave its owners permission to receive designated hazardous substances. Business boomed. Only a few miles from the Baltimore beltway and within easy access of industries concentrated around Baltimore harbor, the landfill accepted 173,800 metric tons of hazardous wastes in 1980.

The Solley Road landfill is not part of the underground network of midnight dumping, but an example of the kind of facility Congress had in mind when it passed the Resource Conservation and Recovery Act (RCRA) of 1976: it is a secure landfill operating under the supervision of the state health department. Browning-Ferris Industries screens its clients. The landfill accepts only solids and sludges, and BFI requires potential customers to send samples of their wastes to the company's Houston laboratory for chemical analysis before they agree on a disposal contract. The landfill is well-constructed and well-monitored.

Nevertheless, community residents are not happy to have the dumpsite for a neighbor. They're concerned about truck traffic to and from the facility, about dust and fumes from the site, and about the presence of a large concentration of toxic chemicals within several miles of their homes. Nor do residents like the fact that Solley Road accepts wastes from out-of-state. Why should their community be responsible for someone else's mess?

People in Smithfield Valley, Pennsylvania face similar concerns and are pioneering a new approach. When IU Conversion Systems, Inc. announced its plan to use property there for a dumping ground, Valley residents protested with billboards, placards, and televised town meetings. The uproar goaded IU to set up an unusual committee—a board made

In this makeshift incinerator, exhaust gases escape, so waste disposal becomes air pollution. RPI's William Shuster advises New York State on a master plan that includes incineration—safe *incineration.*

Rensselaer Polytechnic Institute

up of nominees from local organizations (among them Franklin and Marshall College)—to look over the company's shoulder as it went about evaluating sites.

F&M structural geologist Edward Beutner is on the committee which, he says, will take part in the site selection process from start to finish. The committee will evaluate geological reports and will make suggestions to IU. "We can make strong recommendations," he says, "which won't be binding, but IU would probably have a difficult time pushing the thing through if the committee didn't approve. The public outcry would be large enough, I think, to stop the dump."

IU Conversion Systems doesn't produce toxic chemicals, but is one of the handful of recently-formed companies turning wastes into profits. Beutner explains that waste producers send samples to IU, which determines whether it can stabilize or otherwise treat the waste. Material will be spread in on-site landfill, which will be engineered for total containment.

Beutner and fellow F&M geologist Marvin Kauffman agree that IU's Narvon property—the preferred dumpsite—has a complex geology. The land within Pennsylvania's border, like much of the Eastern seaboard, is ribboned with layered sedimentary and metamorphic rocks, layers which have been folded, uptilted, and eroded. Kauffman's map of the area, patched from various sources (including maps produced by the U.S. Geological Survey and some done by F&M students), indicates that the proposed site does have faults running near it.

Kauffman says that "it's a touchy issue. Anyone living in the area would be concerned. The drinking water has been very pure, but now there's a fear of its being tainted. The person with property is biased because he thinks there's a danger that the property values around a dump might go down; the state of Pennsylvania is concerned about finding sites because otherwise industry will move elsewhere."

RCRA limits federal presence in waste disposal to designating hazardous substances, defining requirements for cradle-to-grave tracking, and establishing performance standards for landfill sites. RCRA relies on the private sector to develop and expand existing treatment and disposal facilities (under EPA standards). The theory is that mandatory guidelines will stimulate private development: If improper waste disposal is illegal, and is penalized, waste generators will have to pay for proper disposal, and waste-service firms will therefore enter the disposal business. EPA regulations based on RCRA leave to states and local governments the problem of finding landfill sites. The enforcement arm of the EPA has recently been dismantled, and such compliance as the law requires now rests with the good will and strong arm of the individual states.

Environmental Protection Agency

Corrosive chemicals eat their way through storage drums. Containing hazardous wastes is not a one-step job, even at well-designed landfills.

In an ideal world, each type of waste would be considered alone and disposed of individually, in the most economical manner that avoided every important adverse effect. Such an ideal solution is useful as a point of reference, but little help in making complex assessments of risk-benefit. For example, if only $1,000 is available, would it yield greater benefits to destroy a ton of organic pesticide wastes through careful incineration? Or would it be better to spend the same amount to encapsulate ten tons of non-burnable heavy-metal-contaminated sludges? In the real world, a state planner might have 50 different wastes originated in 30 different sites. Given shipping costs, where should the central facility be? What facilities will handle the largest portion of hazardous wastes, at a cost low enough that manufacturers will not be driven to midnight dumping?

Suppose we can determine that incineration is feasible for a particular waste. Is there enough burnable waste in a state to justify investment in a complex incineration plant? Where should it go? William Shuster of RPI has described the complication of this type of evaluation, now going on in New York State. "We have a number of questions to wrestle with. Should there be one plant or many plants? With more plants the hazards of accidents during transport would be lower. On the other hand, construction and operating costs would be much higher for a multiple-plant network than for a single centralized facility. With a number of plants scattered through the state we would spread the hazards from accidents and spills to more regions."

To resolve the inevitable conflicts over the choice of future land disposal sites,

In Stow, Massachusetts: tracking the backyard polluter

Worcester Polytechnic Institute

Groundwater pollution can originate in sources other than landfill, and major industries are not the only culprits. Small towns and rural communities all over the United States have traced polluted well water to leaking gasoline storage tanks, to pesticide containers dumped beside a barn, to overloaded septic systems—all places where no one thought to look until the damage was done, and all places that escape EPA or state regulations.

Malcolm FitzPatrick, Associate Professor of Urban and Environmental Planning at Worcester Polytechnic Institute in Worcester, Massachusetts, is hazardous waste coordinator for the town of Stow, Massachusetts. Residents of Stow, pop. 5,148, get their water from wells, their sewage disposal through septic systems. And they're worried about their water.

FitzPatrick wants to identify practices that may lead to underground water pollution *before* the problem gets serious. He has, for example, found piles of road salt, stored by the road. Water inevitably finds its way into some of the piles, and the salt melts and makes its way down into the aquifer. It is not toxic in itself, but its slow accumulation is undesirable: no one wants municipal water that is undrinkably salty, or that corrodes pipes and kills lawns.

Many rural areas, like Stow, rely on septic systems to dispose of waste from kitchens and bathrooms. In such systems, water carries the waste into underground tanks, where solid particles settle out. The effluent then moves through a series of perforated pipes. These spread the leaking fluids throughout the area, to be cleansed by the natural filtering capacity of the soil. This filtering capacity, however, can be overtaxed. In the particular case of Stow, there is a cottage industry of assembling small-scale components of electronic devices. These businesses use septic systems to dispose of small amounts of hazardous acids.

In addition, both homes and small businesses still use trichloroethylene and similar solvents to break up scum and prevent clogs in their septic system. Trichloroethylene is linked with liver and kidney disorders and is a suspected carcinogen, and its chemical cousins do not seem to be much better.

So far, FitzPatrick says, Stow's problems are not serious. But he is watching the situation. He has begun mapping the local aquifer to locate recharge zones, places where surface water enters the ground to replenish water supplies. This map will be used, he hopes, to redraw local zoning so as to restrict construction in certain critical zones, or to require waste treatment and containment rather than septic systems.

the state of Maryland has created a Hazardous Waste Facilities Siting Board. The Board has the power to issue a "certificate of public necessity" overruling local zoning objections to disposal sites.

The Board may soon review BFI's application to expand the Solley Road landfill. From a geological perspective Solley Road looks like a good site. It rests on the naturally impermeable native Arundel clay. Groundwater in this region is very deep and well protected by overlying strata which provide a natural confining bed. It would be difficult for significant quantities of leachate to migrate from the site and contaminate the aquifer.

Local residents view the matter differently. They feel they are carrying an unfair share of the environmental risks created by hazardous wastes. The Facilities Siting Board must consider the broader public interest of the state, its need to provide a secure waste disposal site near major waste generators. Availability of state-monitored landfill is certainly critical to the state's plan for safe disposal.

Robert H. Roy, Dean Emeritus of Engineering Sciences at Johns Hopkins and now chairman of the Maryland siting board, agrees in principle with the residents: "Landfilling should only be used as a last resort." But, he adds, "we don't have any alternative. People realize we must have jails, power plants, and hazardous waste landfills, yet no one wants these in a nearby neighborhood. No one really understands toxic chemicals. But the pervasive fear on this subject has become a national paranoia. We have to act. Everyone is looking for a no-risk society. It doesn't exist."

Most states, naturally, are reluctant to drive out industry; at the same time they are under pressure from residents to eliminate pollution. New York State, attempting a compromise, is conducting an in-depth study, with Shuster's help, on the availability of technology for treating wastes and producing energy from waste incineration. According to Shuster, the state is dedicated to the idea of doing something about its serious pollution problem. The governor is behind the project, as is the legislature. Yet "there's a sensitivity to being too tough," says Shuster. "The state doesn't want to drive anyone out. The legislature is leaning in the direction of tax incentives and technical help for small companies." Maryland's Robert Roy echoes the warning: "If we don't make it feasible for industries to do this economically, then generators will resort to illegal methods."

An Illustrated Compendium of Commonplace Objects

Fancies are dispelled, facts revealed. The surprising histories of these everyday objects are here unveiled, except the boring parts.

1 Across

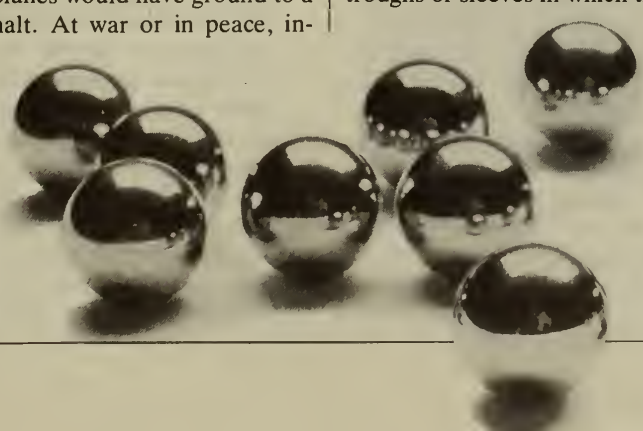
The first U.S. crossword puzzle was prepared by Arthur Wynne and published in the Supplement to the Sunday *New York World* on December 21, 1913.

Ball Bearings

"In those days we anxiously asked ourselves how soon the enemy would realize that he could paralyze the production of thousands of armaments plants merely by destroying five or six relatively small targets," wrote Albert Speer, the architect who became Hitler's Minister of Armaments and War Production. The five or six targets were factories turning out more than two million ball bearings a month.

Several times during 1943, British and American squadrons did hit the main bearing works in Schweinfurt, but they dropped most of their bombs on airplane factories and dams. Had Allied forces bombed bearing plants consistently, Speer concluded, Germany's cars, trains, tanks, trucks, and planes would have ground to a halt. At war or in peace, industrial countries can be said, quite literally, to run on bearings.

The bearing—any device which eases friction between surfaces moving in relation to each other—has been around since the beginning of recorded history. Ancient oxcarts, chariots, waterwheels, screwjacks, and the like all had bearings, usually wooden troughs or sleeves in which the axle sat, but friction soon broke the axle shafts and wore down the bearings. Tallow and oil were poured over these early bearings, but to little avail: in one 16th-century waterworks in Toledo, Spain, the major expenses recorded were tallow, for lubrication, and charcoal, for repairing worn parts at the forge.



Efficient bearings, particularly ball bearings, weren't widely used until the 19th century, but quite a few ways of cutting down friction had been devised by Leonardo da Vinci. Most of da Vinci's innovations stayed in his notebooks, only to be discovered with astonishment by people who had reinvented his bearings 500 years later.

For axles which made com-

plete revolutions, Leonardo first improved on traditional trough bearings by adding a top bushing. This clamp could be tightened, so that even as the trough wore down, the axle would not jump around. Then he suggested that the same arrangement, an adjustable "mother" holding the axle firm, would offer far less resistance if it were not made of wood. One could be cast from mirror metal, "three parts copper and seven parts tin." Two centuries later, Robert Hooke suggested the same clever idea to the Royal Society of London. Leonardo was the first to design ball bearings in a race which kept them from touching but let them turn freely. He also devised a way to mount a vertical axle on three conical bearings—a method reinvented in the 1920s for use in blind-flying instruments.

At first metal bearings had to be made at the forge, one by one. Not until 1868, after Bessemer had invented a way to blow air through molten pig iron to make high grade steel, was a method for mass-producing bearings patented. In 1898, when bearings were first used in hubs and headsets, there was a boom in bicycle sales. The bearing industry really got rolling.

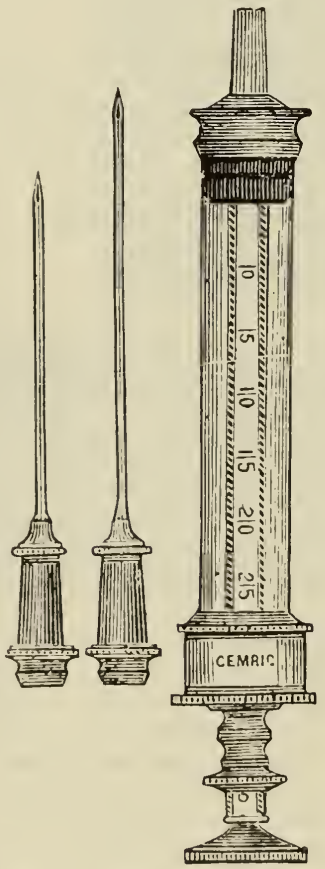
Today bearings are among the most accurately machined objects in the world. In a precision factory, same-size bearings may differ from one another by as little as five one-thousandths of an inch, or 13 thousandths of a millimeter. Bearings can perform under high speeds (in an average turbofan jet engine, at 10,000 spins per minute), high heats (temperature about 600°F), and heavy loads (say, 2,500 pounds per cubic inch).

Still, there are some cases where the old ways prove best: on many propeller-driven ships, shafts rest in self-lubricating, water-repellent sleeve bearings made, not of metal, but rather of resinous lignum vitae wood.

Hypodermics

In the 1660s the English architect Christopher Wren, best known for designing St. Paul's Cathedral, convinced Oxford chemist Robert Boyle that a pipe could be inserted into an animal's blood vessels so that drugs could be injected directly into the bloodstream. The two men used a quill attached to a syringe to inject opium into a dog. (It lived.)

Nearly two centuries later the hollow hypodermic needle



came into general use. Some say the inventor was Francis Rynd of Ireland; others cite French surgeon Charles Gabriel Pravaz. In the earliest models, the puncture through the patient's skin was made with a lancet or, wrote Rynd, "with the point of the instrument itself, pressed through the skin to the depth required." By the mid-1850s, syringes were marketed with graduated scales, for accurate control of doses.

Coffee

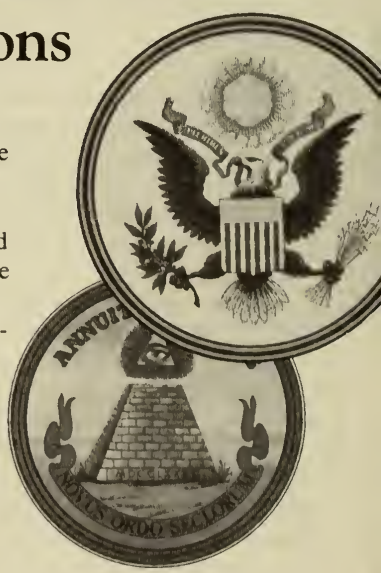
"It fortifies the members, it cleans the skin, and dries up the humidities that are under it, and gives an excellent smell to all the body." So wrote a 10th-century physician of the *bunchum* bean. Healers ascribed to it improbable powers; goats and saints figured in legends of its discovery; religious leaders issued it to followers that they might stay awake during nightly devotions.

Discovered growing wild in Ethiopia more than a thousand years ago, coffee was first grown commercially in Arabia's Yemen district during the 15th and 16th centuries. The Arabs kept others from trading in coffee by drying or boiling the beans before export, so they would not germinate. But coffee berries were still smuggled out, often by pilgrims to Mecca, and grown.

Arabs gathered in coffeehouses—"schools for the wise"—to hear news, listen to storytellers, play chess, and dance. Coffee soon became known as "the wine of Araby" because some Muslims regarded it as a substitute for wine, which their religion forbade. Because coffee was sometimes considered intoxicating, and because coffeehouses often were sites of religious and political arguments, certain 16th-century Muslim officials banned the beverage. So drinkers gathered in back rooms to drink a bootleg brew. Coffee nearly suffered similar persecution in Europe; certain priests appealed to Pope Clement VIII (1535–1605) to forbid it to Christians as the drink of infidels. The Pope tried it, liked it, and baptized it "a truly Christian beverage."

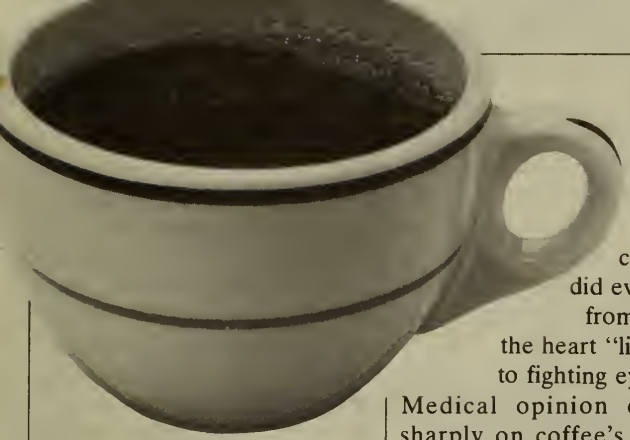
The lift one gets from a cup of coffee comes, of course, from caffeine, which affects the central nervous system. Small doses—the amount in one or two cups of coffee—stimulate cerebrocortical areas associated with conscious mental

Messages Found on a Beer Can—and Other Object Lessons



Perhaps it is a measure of the human condition that we accumulate objects—from the simplest tools to complex and expensive works of art. These objects are cultural artifacts, as is the entire man-made environment: the shape of our cities and towns, the buildings we inhabit, the images that bombard us from the streetscape or the cathode tube—all are richly symbolic attempts to inform or bring order to society.

Artifacts are non-verbal: they communicate in the language of semiotics, the meanings that signs and symbols convey to the mind of the viewer. And the language of artifacts changes over time. The Latin phrases of the Great Seal of the United States, for example, were readily understood by educated



1657 claimed it did everything from making the heart "lightsom" to fighting eye sores. Medical opinion differed sharply on coffee's virtues. "Syrop of soot and Essence of old shoes," sniffed one doctor. But William Harvey apparently saw it as a panacea; he bequeathed the Royal (then London) College of Physicians a 56-pound bag of coffee berries that they might assemble and drink to his memory.

Most English physicians agreed, however, that coffee "helpeth digestion and procureth Alacrity"—and that it was a cure for drunkenness, then the root problem in the majority of cases treated. Coffee not only cleared the head; but it also gave people an alternative to the tavern, until then the only center for socializing. Coffeehouses sprang up all over Europe and rapidly became centers for gossip, gambling, literary and political talk, and even business deals. Lloyd's Royal Exchange and Registry of Shipping grew out of Edward Lloyd's modest coffeehouse. Napoleon Bonaparte, then a young artillery officer, was so fond of coffee that the proprietor of the Café de Procope once made him leave his hat as security while he went out seeking funds to pay his coffee tab.

Of non-alcoholic beverages, coffee has always been the U.S. favorite. It's followed, in order of popularity, by soft drinks, milk, juice, and tea. People buy a particular coffee for its distinctive taste. Each brand has its own secret formula for blending beans, but to ensure that its trademark taste appears in every batch, each company employs coffee tasters, or cuppers. Cuppers pour hot water over prepared grounds, then inhale the aroma of the foam. They quickly take the mixture into their mouths, tasting for acidity, body, and the brand's special flavor, then spit the grounds into a cuspidor. The most skilled cuppers can identify the country and altitude a bean comes from, blindfolded.

Fifty-six per cent of the U.S. population drinks coffee regularly, at an average of 3.41 cups per day. Half of all coffee consumed in the U.S. is drunk at breakfast, one-third between meals, and the rest at lunch and dinner. The preferred style is black and unsweetened, brewed as opposed to instant. Half of all coffee drinkers use an electric drip coffeemaker. One out of seven imbibes the decaffeinated variety—compared with one in 25 in 1962. In 1980, U.S. coffee drinkers consumed one-third of the world's output, mostly from Brazil and Columbia—some 2,456,072,300 pounds.

processes; ideas become clearer; thoughts flow more readily, and fatigue decreases. "Caffeinism," associated with ingesting more than 1,000 mg/day (about ten cups of coffee), causes such excessive stimulation that it may produce symptoms like those of anxiety neurosis, including nervousness, irritability, agitation, headache, and muscle twitches.

European coffee merchants tried to capitalize on the invigorating effect of coffee by promoting it as a fad health beverage. One advertisement in

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Americans at the beginning of the 19th century. "Annuit Coeptis" and "Novus Ordo Seclorum" informed readers that since the year of its creation Providence has been watching over the nation that would establish a new political order for the ages. The seal's iconographic language—a seeing eye, the pyramid, the eagle with constellation overhead—conveyed this message even to illiterate Americans.

Today, of course, the imagery of 18th-century republicanism is as foreign as Sanskrit. Few people notice, and fewer comprehend the meaning of, the Great Seal, even as it passes through their hands daily on the dollar bill. Yet these symbols, and the neoclassical design of the public buildings constructed in the nation's capital, reassured Americans of the revolutionary generation that theirs was a government that would not tyrannize liberty.

Another object, the Victorian sideboard, is vastly different in function but also celebrated tradition at a time of great change. The manifest functions of the sideboard were to display silver, china, and glass, and to hold serving dishes and platters. These sideboards dominated the dining room, not only because of their size but also because of their ornately carved panels of fruits, grains, fish, and game. The most extravagant examples depict the hunt, the primitive chase of wild animals once essential to the provisioning of family or group. Some Renaissance revival examples of the 1880s even incorporate carvings of hunting dogs and dying stags. Who, one is tempted to ask, could enjoy a meal while surrounded by the relics of barbarism?

Although this iconographic program seems alien today, most such sideboards adorned the dining rooms of middle and upper class families. For these people, the new differentiation of places of work and residence led to the enshrinement of the home as a domestic utopia, protecting women and children, and gave the dining room special significance: here the husband and father presided, carving the meat and acting as intermediary between the family's closed world and that of outsiders entertained at the table. Moreover, the sideboard's panels celebrated man's traditional role as provider—at the very moment when the husband was no longer bringing home the produce of the fields or the prizes of the hunt but their symbolic equivalent, the weekly wage.

Other objects attest to what Kenneth Ames has called changing "social strategies." The calling card of the 19th century, for example, contained only a name. Anything more would have been superfluous: everyone knew everyone

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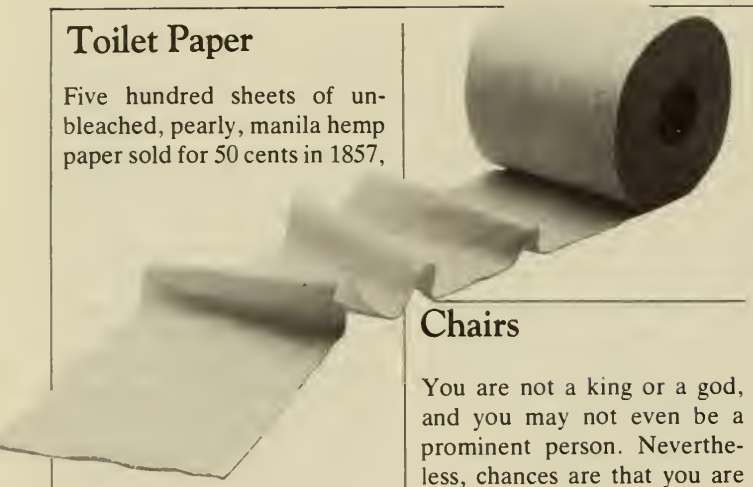
Toilet Paper

Five hundred sheets of unbleached, pearly, manila hemp paper sold for 50 cents in 1857,



when Joseph C. Gayetty of New York City became the first U.S. manufacturer of toilet tissue. Gayetty's "Medicated Paper" was "a perfectly pure article for the toilet and for the prevention of piles." The maker stood behind his product: every sheet was watermarked with Gayetty's name.

Chairs

You are not a king or a god, and you may not even be a prominent person. Nevertheless, chances are that you are reading this while seated in a chair. "In" gives an idea of how the chair has evolved. Important people were enthroned "on" the earliest versions.

In ancient Egypt, chairs—simple rectangular seats that often had folding X-shaped frames—were used by the ruling class and by traveling officials. Greeks and Romans reclined on cushioned couches at formal gatherings, but also used folding chairs and stools—which again came in handy for generals and traveling officials. Medieval faldstools descended from these.

Chairs as we know them were seldom seen in medieval European households. People squatted on the floor, or sat on benches, on upturned wicker baskets, on chests, or whatever else was near. By 1600, when ordinary people started to use chairs, the head of the household would be enthroned upon the family chair, essentially a stool with an upright back.

Through the 17th century, furniture in general had a moveable quality: the French *meublés* means just that, moveable. Even a traveling nobleman would carry his household goods with him, or do without. In 1649, for example, the King of France's daughter once had to sleep on straw: her bed had been left behind.

By the 18th century, chairs were being designed for the sitter's comfort. Uprights were no longer so upright. Slanted, they invited sedate lounging. Curves and double curves gave a sinuous grace to the frames, and cushions were no longer an afterthought, heaped on a bench or chest, but were designed with the frame. Fads in clothing changed chair design. To make room for hoop skirts, for instance, chair arms receded. It became possible to loll.

In the 19th century, metal coil springs became the base for upholstery and new methods of weaving made it easier to stuff and cover cushions. The chair frame disappeared under mountains of bloated upholstery. In France, the chair

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else in a particular social group. By contrast, the contemporary business card identifies the individual by occupation and company or institution. Thorstein Veblen anticipated this phenomenon a century ago in his remarkable book, *The Theory of the Leisure Class*. According to Veblen, the change from intimate communities to modern mass society created the need for vicarious forms of identification. Most obviously, we stake our claim to status by the things we own. But in a more subtle way, as every casual introduction affirms, we define ourselves not by what kind of person we are, but by our job and our institutional affiliation. The business card, one of the most ubiquitous manifestations of corporate America, has become a token of identity within the impersonal structure of modern society.

The most commonplace objects carry a message, even as they serve their mundane functions. A can of Pabst Blue Ribbon Beer, which is made of rolled and stamped aluminum, is admirably adapted to hold its contents without altering the flavor. And, for those of us who could never find an opener, it has a convenient top that pops. But the design of the can, an inheritance from the labels on glass bottles, reflects the history of product and nation. The red, white, and blue design appeals to patriotism, the representation of barley and hops informs the buyer of the beer's ingredients, and the blue ribbon attests to quality. The script at the bottom boasts that Pabst was selected as America's finest in 1893—at the World's Columbian Exhibition, held in Chicago to commemorate the four hundredth anniversary of the discovery of the New World; the script at the top claims that the brewery was established in Milwaukee in 1844, when many Germans were fleeing their native land because of political instability. Not coincidentally, the blue ribbon identifies the product's merit even to a consumer who cannot read English.

The historicism of this beer label is seldom seriously considered, but as with many other objects, historicism itself is the point. The images and objects of one era often appeal to succeeding generations as quaint reminders of a simpler age, perhaps a golden one. Herein lies one important function of the cultural artifact in the contemporary world. We use history, or at least chosen aspects of history, to address current issues or psychological demands.

The 1920s, for example, are usually described as a decade of dramatic, even traumatic change. And yet the '20s witnessed the creation of such notable monuments to the American past as the Henry Ford Museum, John D. Rockefeller's restoration and reconstruction of Colonial Williamsburg, and Henry Francis Du Pont's collection of paintings and decorative arts at Winterthur. Significantly, these men were all associated with technologies that transformed American society. Nevertheless, as if recoiling from the implications of their actions, they looked to the agrarian, pre-industrial past—to their own backgrounds—as the source of national greatness. The objects they collected, high style or low, beautiful or useful, served as a tangible contact with history and provided a sense of place and time.

Today Americans visit museums in record numbers and collect artifacts of every type. As a culture we seek reassurance in the past, answers to questions of identity and tradition. John Ruskin, the 19th-century English critic, once defined architecture as the "lamp of memory," the collective heritage of a nation. "We may live without her, and worship without her," Ruskin wrote, "but we cannot remember without her." Commonplace objects also serve this purpose, establishing continuity with the past at times of great change.

David Schuyler
Assistant Professor, American Studies Program,
Franklin and Marshall College

Photography by William Denison

known as the *confortable* evolved.

In the United States, changing technology had another effect, as the age of patent furniture dawned. Every reasonable mechanical variation had already been explored by the Age of Reason: chairs had been made to raise and lower, to swivel, to roll, to lean when the sitter moved. But now the impulse arose to make the chair more than a chair. Like other furniture, chairs sprouted levers. A chair became a lounge, a piano housed a bed, a bed became a wardrobe.

Another technological advance, tubular metal, appeared in chairs as early as the 1850s: the tubes were shaped and painted to resemble wood. In Britain, a cantilevered rocking chair appeared—a frame of strong, flexible tubing curving upward in a lazy S from the floor. But the idea didn't catch on until the 1920s, redesigned by Marcel Breuer (and others) and usually called the Breuer chair.

The new chairs at first seemed shocking, almost truncated. But many design awards later, such chairs, with their clean, strong, almost industrially precise shapes, almost seem to speak for the 20th century.

Synthetic Suds

On October 10, 1933, a sodium alkyl sulfate made from chlorosulfonic acid and a fatty alcohol went on the market for use in the home. A Cincinnati firm named Procter & Gamble gave the first synthetic detergent a catchier name: Dreft.

Ball-point Pens

The first workable ball-point pen was invented and patented in 1938 by two Hungarian brothers, Ladislao and Georg Biro. When World War II broke out the brothers moved to Argentina, where they set up the first ball-point pen company.

A few years later, Milton Reynolds, a shrewd U.S. businessman, bought several Biro pens while visiting Buenos Aires. With the help of an engineer, he redesigned the pen just enough to claim his own U.S. patent. The original Reynolds ball-point is simple in concept: a small ball rolls in a socket on the tip of the pen, transferring ink to paper. The ball is lubricated by the ink itself, which gravitates to the paper from a reservoir in the pen's body. The reservoir does not dry out because, when the ball is not moving, it acts as a seal.

Both the British Royal Air Force and the U.S. Air Force used ball-point pens during World War II. Flight crews needed a convenient and versatile pen, and the traditional fountain pen was just too sloppy.

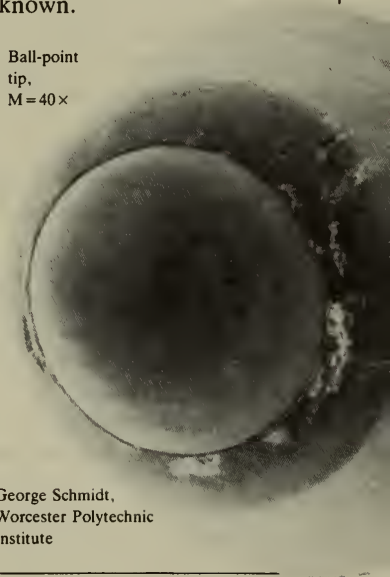
After the war, the ball-point pen became a fad. It was, after all, guaranteed to last for two years, "a veritable camel of a pen." On October 29, 1945, thousands of people lined up outside Gimbels' New York store to pay $12.50 for "The Fantastic Atomic Era Miraculous Ball-Point Pen—guaranteed to write underwater." Macy's imported Biro pens from Argentina and sold them for $19.98. Some people flew in all the way from the West Coast to buy these marvelous utensils.

Still, the fountain pen and the inkwell endured into the mid-'50s. Ball-points were far too inconsistent. The ink leaked, smudged, or faded, and the pen certainly did not last two years. Ball-points were banned from schools. Banks refused to accept checks written with a ball-point, fearing the signatures might fade.

But in 1949, an Austrian chemist named Fran Seech had developed the first successful ball-point ink, in his California kitchen. The Paper Mate Company formed; its success was based on Seech's ink.

In 1980 alone, 1.9 billion ball-points were sold worldwide. These items which 20 years ago sold for $12.50 can now be found scattered and half-empty everywhere.

Early Reynolds pens exist, says collector George James, president of the National Capital Chapter of the Pen Fanciers' Club; they are plain aluminum, as distinguished from red or blue anodyzed aluminum. Only one original Biro is known.



Ball-point tip, M=40×

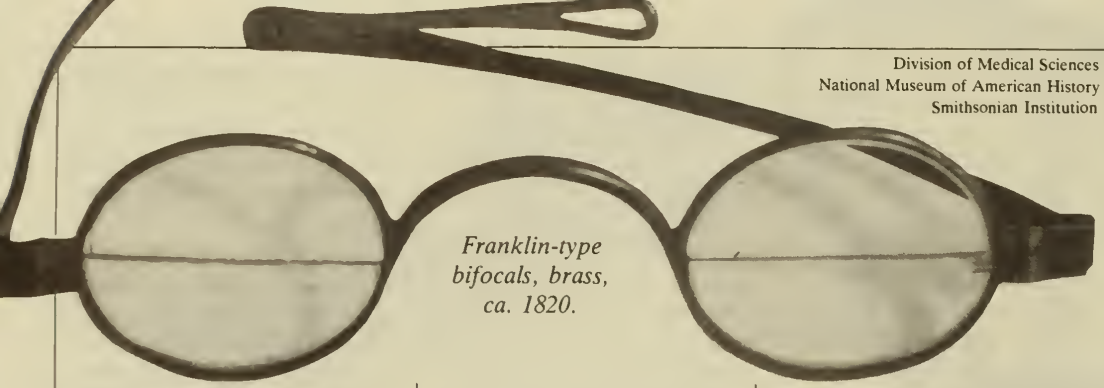
George Schmidt, Worcester Polytechnic Institute

Double Vision

Using two pairs of spectacles was troublesome, Ben Franklin decided. He was tired of switching glasses to read or to look at distant objects. So he had the lenses cut up, and half of each lens set together in a circle. The result: the first pair of bifocals.

In 1785 Franklin wrote a friend from abroad, "This I find more particularly convenient since my being in France, the glasses that serve me best at table to see what I eat, not being best to see the faces of those on the other side of the table who speak to me; and when one's ears are not well accustomed to the sounds of a language, a sight of the movements in the features of him that speaks helps to explain; so that I understand French better by the help of my spectacles."

The bifocal idea was sug-



Division of Medical Sciences
National Museum of American History
Smithsonian Institution

Franklin-type bifocals, brass, ca. 1820.

gested in 1716 by a man named Hertel and had been experimented with in London as early as 1760. Advances in bifocals paralleled a growing need for them as people lived longer and as they turned from farming to industry and business. In the 1800s, the lenses' popularity contributed to developing vision examination procedures in the nascent field of optometry: the wide range of bifocal lens combinations made it no longer possible to select ready-made glasses off the shelf or from a peddler's wagon.

Dissatisfaction with bifocals for such activities as reading music—farther away than a book, but not *that* distant—may well have contributed to a growing use of trifocals in the mid-1930s. In the '70s, the preference among wearers of bifocals shifted to "invisible" bifocals—those that had no visible demarcation between lens powers.

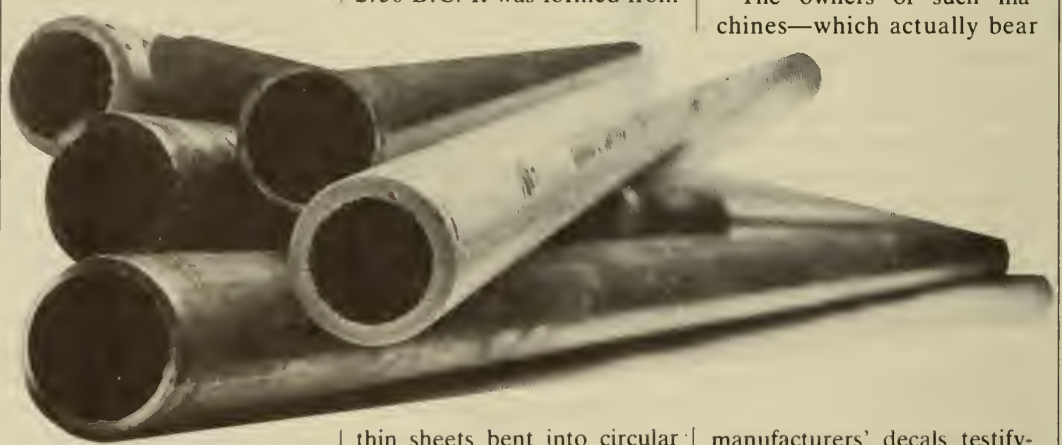
One out of every two Americans (113 million people) wears corrective lenses. Of this number, 40 per cent (45 million) wear bifocals and five per cent (six million) wear trifocals. Recently two companies began selling bifocal contact lenses. In January, the Food and Drug Administration started talks with the two companies, which may halt sales for more testing on the lenses—a temporary setback, say the companies.

Vending Machines

Forerunner of those contemporary machines which dispense coffee, soup, or cola—usually two seconds before the paper cup meant to receive the liquid has plopped into place—was the Automatic Clerk. Built by T. S. Wheatcraft of Rush, Pennsylvania, it was the first vending machine to sell from bulk. A six-foot-high wooden cabinet equipped with heater, bags, bagger, and weighing device, the Automatic Clerk proffered bags of hot peanuts.

Pipes and Tubing

Shopping carts, automobile exhausts, house plumbing, bicycles, electrical conduits, handrails, and air conditioners all use tubes. Or pipes, which are the same thing.



Well, not quite: "The difference between pipe and tube," notes one construction materials text, "is a complex thing to explain." Each lets something—like water or wire or steam—pass down its hollow length. And each boasts impressive strength for its weight. "Tube," though, seems to emphasize the latter quality, "pipe" the former.

Pipes have been around a long time. Earthenware jugs balanced atop the head could carry only so much water. Open channels, the earliest aqueducts, were vulnerable to contamination. The first real pipes may have been pottery vessels with their bases broken off, laid end to end. In 1958, a 150-year-old pipeline was unearthed near Honolulu. It was a mile long and consisted of 6,500 ceramic liquor bottles each 10 inches long. The neck of each had been inserted into the broken bottom of the next in line, the gaps plastered over with clay.

An early form of copper pipe has been found at Abusir, Egypt, and dated from about 2750 B.C. It was formed from thin sheets bent into circular tubing, the resulting longitudinal seam simply folded over and hammered tight.

"Pipes," then, carry water to our homes, Alaskan oil to the Lower Forty-Eight; "tubes," though, are light yet *strong*. Take a wire coat hanger and untwist it to its full yard's length; it will bend and flap uncontrollably. But take the same weight of material and fashion it into a thin-walled tube of the same length, and it will stand rigid, supporting its own weight and more.

Fashion it how? Today, welded pipes are made by feeding steel strip into a machine that continually rolls it into a tube and welds the resulting seam. Seamless tubing, a better class of product, starts out as a round bar of steel. It is then forced between fast-spinning heavy rollers onto a mandrel, in effect impaling it—all at some 1300° Centigrade.

Tubing is used for anything that needs to be lightweight, yet strong: airplanes, automobiles, some bridges—and bicycles. In a bicycle frame, tubing is "butted," meaning it's beefed up where subject to higher stress, left thin—perhaps just a sixty-fourth of an inch—where it's not. Such a frame, custom-made from an exotic alloy of manganese-molybdenum steel, may cost upwards of $500. But it will withstand the punishment of 200 pounds hurtling down a bumpy Alpine road at 50 miles an hour, and yet weigh in at only 5½ pounds.

The owners of such machines—which actually bear manufacturers' decals testifying to the pedigree of their tubing—are wont to sneer at lumbering department store bikes that weigh twice as much. "Lead pipe specials," they call them.

A Future in Ivory Substitutes

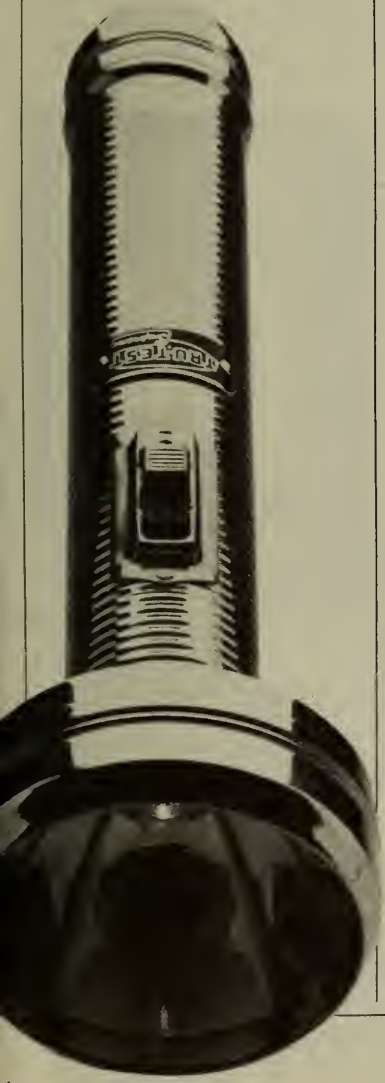
A shortage of elephants in 1863 resulted in the invention of plastics. John and Isaiah Hyatt, inventors of celluloid, were the winners of a $10,000 award offered by a Philadelphia billiard ball manufacturer seeking a material to substitute for ivory.

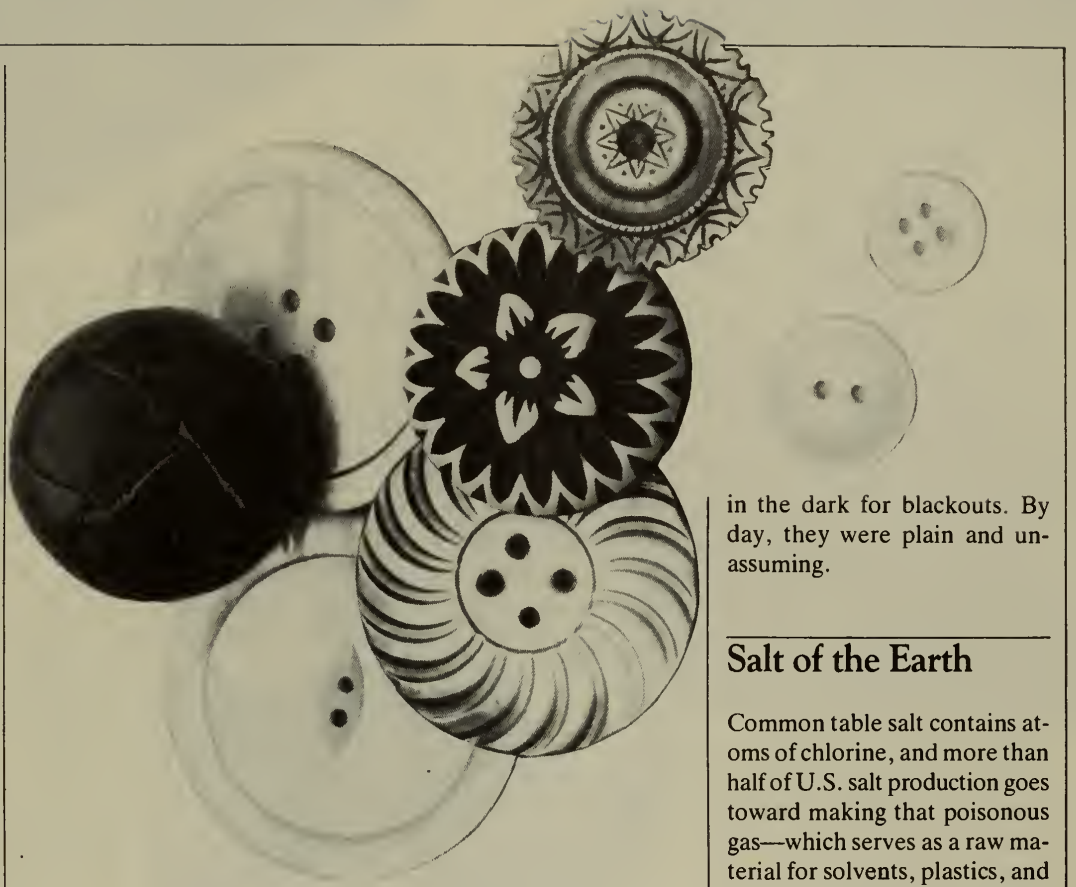
Flashlights

When Joshua L. Cowan, inventor of the toy electric train, connected a dry-cell battery with a light bulb at one end of a metal tube and a switch at the other, he'd invented the flashlight. But Cowan didn't realize it; he wanted a device that would light up flowers in their pots.

Seen as a toy or novelty, the first commercial flashlight was made by the American Electric and Novelty Manufacturing Company, later known as American Eveready Company. In 1898 the New York City firm produced its initial crude model. The tube was paper, with metal fittings. Instead of a lens, its light was reflected by a rough brass shield.

Early flashlights were hardly light. The dry cell was six inches long and the whole tube weighed about six pounds.





Buttons

Buttons with buttonholes are of little advantage without tailored clothes. Ancient Greeks, Romans, Chinese, and Egyptians kept their flowing robes in place with clasps, buckles, sashes, and fibulae (ancestors of the modern safety pin), and early buttons seem to have been strictly ornamental. Still, some scholars contend that buttons and buttonholes date from paleolithic days.

Whatever its beginnings, the button's first utilitarian appearance in western Europe came as the Dark Ages were brightened by Persian spoils from the Crusades. Metal buttons, often of gold or silver, were worn by 13th-century royalty and nobility. (A French law required clerks and people of lower ranks to wear cloth- or thread-covered buttons.)

By the reign of Louis XVI, buttons fashioned of precious metals, ivory, diamonds, and other gems were desired; many were one-and-one-half inches in diameter. Some buttons featured elaborate and often bawdy scenes of court and courting life. Fops coveted them; republicans despised them.

Across the Channel, the English government, seeking to protect its button industry, decreed in 1688 that only metal buttons were to be made and worn. The French, contrariwise, to protect the silk industry of Lyons, had laws to encourage the manufacture of fabric-covered buttons. The English law was eventually rescinded, in 1727, but meanwhile English advances in button making—machine dies for pressing, stamping, and decorating—were applied to producing all types of metal objects, including parts for clocks and weapons.

By the end of the 19th century, the first plastic buttons had appeared. One early patent, in 1879, went to William Niles of Jersey City, New Jersey. Niles's ornamental buttons were made from a mixture of materials that included blood. During World War II, a U.S. manufacturer treated buttons chemically to produce a variety that glowed in the dark for blackouts. By day, they were plain and unassuming.

Salt of the Earth

Common table salt contains atoms of chlorine, and more than half of U.S. salt production goes toward making that poisonous gas—which serves as a raw material for solvents, plastics, and "automotive fluids." As it happens, not eaters but the automobile may account for the largest use of salt, from chlorine-derived antifreeze and plastics to the road salt that helps keep icy highways clear.

Chemically, a salt is the product of an acid and a base. Common table salt can be viewed as the mating of a particular, very strong acid (hydrochloric) with a particular, very strong base (sodium hydroxide, or lye).

The resulting compound helps melt snow by depressing its freezing point. It preserves meat and fish by establishing an environment hostile to bacterial life. It is used to manufacture dye and soften hard water. And it seasons food—but too much of it can upset the body's fluid balance and help cause hypertension.

Salt is found in vast underground deposits that occasionally thrust up to the surface, as in Hungarian Transylvania. It's found in beds left behind by extinct ancient seas. It's found in the oceans of the world, sodium chloride along with less common salts, at a little-vary-

ing concentration of 35 parts per thousand. There are whole mountains made of salt, natural "pillars" of salt, lakes and inland seas that are 10, 15, 20 per cent salt and more.

So there's no great problem finding it; transporting it's the trick, because the need is always for great heaps of it: preserving a pound of bacon takes a full pound of salt. Humans typically consume about 10 pounds of table salt a year; indeed, salt consumption figures have been used to estimate population . . . And these days, just keeping the nation's roads clear of snow takes more than fifteen billion pounds of salt a year.

Blood is a saline solution: plasma is 90 per cent water, 9 per cent protein, and .9 per cent salts. That sodium chloride is necessary because it helps proteins dissolve. So vital is salt to human digestion, in fact, that as the nomad evolved into the farmer, its use became daily. The nomadic hunters got enough salt from raw or roasted flesh, but people on a diet of vegetables, cereals, or boiled meat need salt as a condiment. Salt became truly the salt of life.

Cakes of salt were used as money; a Roman soldier received a *salarium*, an allowance of salt (later the money to buy salt). In some Oriental lands, taxes on salt were so exorbitant that the substance was cut with other look-alikes, as are controlled substances today. The *gabelle* (salt tax) of 18th-century France compelled every person above the age of 7 to buy seven pounds of salt from the government each year. An average family of four worked 19 days per year to pay for its salt. "In Normandy," reported one official, "unhappy wretches who have no bread are daily seized, prosecuted, and their property seized for not buying salt"—a festering injustice that fueled the French Revolution.

Zea mays everta

Popcorn was introduced to the Pilgrims at the first Thanksgiving dinner on February 22, 1630. One of the dinner guests, Quadequina, brother of Massasoit, brought as his contribution a deerskin bag containing several bushels of the popped corn.

Invasion of the Body Patchers

On December 6, 1917, Earle Dickson married Josephine Francis Knight. Without this marriage, the adhesive bandage might never have been invented.

Josephine was prone to fumbling in the kitchen, especially while dicing and chopping. Finally Earle decided to rig up some small prefab bandages by attaching gauze to adhesive tape, and he bragged about the idea at work. His employer, Johnson & Johnson, manufactured household products, including gauze and adhesive. As Dickson would later say, "The boys in the front office loved the concept."

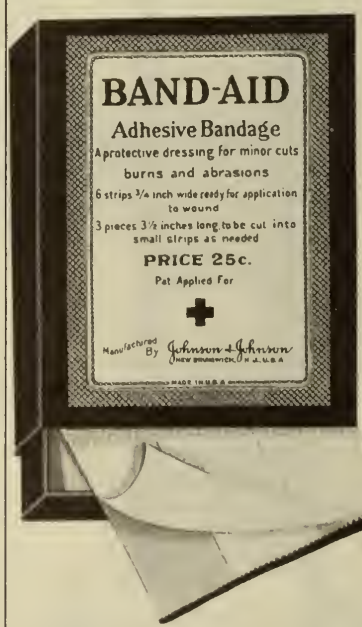
They loved it so much that he eventually became a vice president of the company.

The first adhesive bandages were made by hand from gauze and cotton adhesive tape. Sales were brisk; by 1925, the adhesive bandage machine had been introduced.

In the late 1940s, Johnson & Johnson switched to an elastic backing, so the bandages would stretch and adhere better around joints. The new bandages came in assorted shapes, including a T for the fingertip and an H for knuckle scrapes. Later, these shapes were abandoned in favor of a circular design.

At first, the gauze was treated with Mercurochrome antiseptic. During World War II, sulfa was used. Recently, the use of antiseptic was outlawed because of possible allergic reactions.

Early Band-Aid Brand Adhesive Bandages were white, glaringly obvious on any skin. Later came pinkish "flesh-colored" products and, for a short time, clear ones. Explains Tom Murphy, director of Johnson & Johnson's Kilmer Museum, "Skin colors vary so drastically, we decided it would be



Johnson & Johnson

economically infeasible to produce different colored bandages for the different ethnic groups. But it is an appealing idea to some people."

Latest developments: the H-shaped bandage is back, with an hourglass-shaped cousin (for the injured fingertip).

Compiled by Kevin Bjerregaard, Robert Kanigel, Elaine Langlois, Gina Maranto, and Mary Ruth Yoe.

A Closer Look at George Schmidt

In case you haven't already noticed, photographs by WPI's George Schmidt grace this issue of the *Journal*, on page XIII and on the front cover. Small wonder.

Schmidt, Engineering Assistant in the ME department, is considered by many who've seen his work to be WPI's resident photographic expert. Strictly an amateur, he's shown his work widely and received many awards, incuding first place in the prestigious Boston *Globe* photo contest, worth $1,000—"the only one that's ever paid off," he says. "But these days, that doesn't buy much film."

In a recent interview, Schmidt explained how he got started in photography. Materials sciences, where he's worked for most of his career, can require a great deal of photography to record microstructures of all sorts of things. After serving in World War II, he recalls, he took a job at the Naval Research Laboratory in Washington, D.C., in the metallurgy department. "It was there that I was introduced to the darkroom."

Since joining WPI in 1963, Schmidt has been deeply involved in electron and optical microscopy, photomicrography and technical illustration for books and reports. That he works almost exclusively with color slides serves to distinguish his professional from his leisure-time photographic interests. In the lab, he explains, "we work only in black and white," though through the miracle of polarized

light, false color can be added to photomicrography. "I just like color," he says.

That becomes vividly evident when you walk into Schmidt's Washburn office. Walls lined meticulously with oversized prints reflect the precision with which he treats his subjects, but they stand in sharp contrast to nature's random effects on these subjects—architecture, fields and sea, man-made artifacts.

Schmidt attributes much of his success to a summer photographic program he attended some 15 years ago. There, he believes, he learned "how to look at things," finding more picture opportunities, seeing ordinary things as interesting and beautiful, probing through his pictures how things are put together.

Left, George Schmidt with WPI's scanning electron microscope. Above, Talc Mill in Bethel, VT. Below, Summer House Boarded Up for Winter, Cape Cod.

It was at that Vermont photo school that he also met his wife, Willa, who is herself an accomplished photographer. Though their styles differ considerably, mostly in the intensity with which they treat light and color, they travel extensively together, usually shooting the same subjects but seldom coming home with the same pictures.

Schmidt is also active in the WPI football program. For nearly 20 years, he's been atop the windiest and wettest of press boxes from Lewiston to New London filling miles of film with team movies.

He is president of the Gateway Camera Club of Framingham and the Boston Camera Club. He and Willa host an Intersession course on photographic techniques. They also conduct 25 to 30 programs per year at photo clubs and judge camera club competition across New England. Both George and Willa are recipients of the Excellence International Federation of Photographic Art (EIFAP) Award, given for outstanding exhibitions of their work. They also each hold the distinguished title of MNEC—Master Member of the New England Council of Camera Clubs.

Asked if he's ever freelanced, the characteristically modest reply is: "Well, it's something I might do after I retire. But for now, I'm having too much fun."

WPI CLASS NOTES

WPI Alumni Association
President, Peter A. Kontogiannis '59
Senior Vice President,
[illegible] '60
Vice Presidents,
Harry W. Tanner, Jr. '56
Secretary-Treasurer,
Douglas C. Hartman, '66
Past President, Robert H. McClure, '66

Executive Committee
[illegible]
Harry T. Gillespie, '41, Philip E. Hoyer '50, Donald E. Tobin, '54, Andrew J. Pyne, '67

Term Expires
Henry Bonilla, Jr., '70, Albert Nicholas D'Agostino, Jr. '70, John Edwin Goodell, Pawtucket, RI, Albert J. Lindquist, '70, Philip E. Pearlstein, '70, Richard A. Peters, '71, C. Allen Sanderson, '70, Joseph P. Tierney, '71.

WPI Trust Board
Henry Bonilla, Jr., '70, Albert Nicholas D'Agostino, Jr. '70, John Edwin Goodell, Pawtucket, RI, Albert J. Lindquist, '70, Philip E. Pearlstein, '70, Richard A. Peters, '71, C. Allen Sanderson, '70, John P. Tierney, '71.

1917

Reunion June 3–6, 1982

1922

Reunion June 3–6, 1982

1926

On June 2, 1982, the 60th member **Kenneth Archibald** will retire from the Church with an executive vice president of the Springfield (MA) Chamber of Commerce. While this resolution has not been finalized, it is known that he does the organization on all public affairs and also has been the spokesman. He also oversight and has served as the focal point for the revitalization of the Springfield business district.

Over the years, in the various areas under the jurisdiction of having a more than seventy-year agricultural-related experience. Also, he has been most active in YMCA and has been offered a leadership position, but has declined because of his other activities.

Archibald, who holds a degree in chemical engineering from WPI, worked for a time as a public relations for the New York Telephone Co., with assignments in Albany, Buffalo, Binghamton, Cleveland, and Syracuse. He left in 1947 at the age of 47 as part the post-war exodus to be assistant to area managers and then secretary-manager for the Ludlow-Agawam Chamber of Commerce. He became the Springfield Chamber's top executive in 1961.

In retirement, he plans a private practice of the time on his native Massachusetts. He has been active in Lake Boston, and has been a leader in the Lake Boston Association.

1927

Reunion June 3–6, 1982

Over the months and relatives received invitations for the 55th reunion next June including grandchildren from Willingboro, NJ, and their daughter and two grandchildren from Northfield, MN were on hand for the festivities as well as other guests from Massachusetts, Pennsylvania, Kentucky and Florida.

1930

Ed Jerome is retired in partnership in a 3-man lobbying firm working on various projects in Australia, culminating in the World Expo event in Australia in 1988.

Lou Lemmon '31, made an 8,000 crossing of the U.S. in order to attend ceremonies with his son, Colonel Augustus Lemmon Bergen Baker. The Duke was organized by the Daughters of the American Revolution with the White House Conference on Aging. Lou was the oldest participant at 78.

"The trip took me over the old back eight roads in areas, and it was historic on the road in all cities." The grandmother has now been back Chicago at the opening in Washington, DC, on two days and seventy hours. In Washington they were greeted by their two congressmen, both coming from California, and by two Rhode Island Senators.

Speaking of traveling in general, Lou says, "I've seen the most places since I moved to the Pacific Northwest. I get on the road, drive anywhere and overlook problems and see."

1932

Reunion June 3–6, 1982

1933

Alex Brownie reports that a reorganization in his upcoming. His other interests, as detailed in previous, in duties to and serving his college and associations, post-college work. As a result, he wrote an article describing graduation work, etc. In undergraduate courses for a job, and called it, "Depression Summer." A thesis that had Dr. Brownie studied up on a business over the Alcoholic and treated a day, made no new years changes that take place in the work. "People who have lost through this period, but I work in Medicine. Dr. Brownie has retired from Chemistry, A Dean at Auburn, NY.

Dave Dyer retired from [illegible] eight years ago and is residing in Dana Point, CA. Says Dave, "I retired, contemplated and had difficult adapting at it. However, when I realized that I could do what I wanted, go where I wanted, what I wanted, I became the living 'A.' I no together ... complete enjoyment of the time and it went from one activity and hobby to [illegible] to my income tax [illegible] daughter of my own and grandchildren. Believe me, 'Time flies.'"

Albert Gann of Milford, MA, was honored at a banquet at the Sheraton Inn in Auburn in the area in Hawaii, where he represented the [illegible] and trustee of the Fay Friends Charter Trust Mutual Insurance Co. of [illegible]. He has given talks on the area of insurance to many classes and military groups, including one at WPI. He served as an officer in the New England Professional Insurance Agents and [illegible] organizations. He is the [illegible] for Massachusetts Conservation Department.

Lewis Harvey spent 9 years in [illegible] engineering, with Electric Boat Division of [illegible] throughout the U.S. He has subsequent [illegible] assignments at [illegible] was in project administration for Lewis, [illegible] and [illegible] office building in [illegible]. He is married with [illegible] and [illegible]. The couple has [illegible] children and [illegible] and [illegible] and [illegible] and [illegible] and [illegible].

On Jan. 1, 1982, **John Iannelone** of Van Dyke Gardens, FL, left the Hillsborough County [illegible] with a [illegible] of 27 years for [illegible] Gulf Investment Corporation for eight years. "Now I am [illegible] starting a new [illegible] the agency that sells the [illegible] and

"Mr. Electronics" Honored

John Burgarella, '50, a key figure in the development of many "firsts" in instant photography, has been appointed a corporate officer by the board of directors of Polaroid with the title of senior engineering fellow.

Currently the assistant division manager of the Equipment and Facilities Engineering Division, he was recently honored for his technical contributions during his 21-year career with the firm.

At Polaroid, Burgarella is known as "Mr. Electronics" for his leading-edge work in the Color Pack-2 and the SX-70 system. Most of his 25 patents are in electronics and magnetics, with several in mechanics. His pioneering contributions include the electronic exposure control, the electronically-programmed camera, the electronically-sequenced and electronically-fired flash unit, and use of photodiodes and power transistors on integrated circuits.

In 1950 Burgarella received his BSEE with distinction at WPI, and later received his master's degree. His son, Steven, a mechanical engineering major, is currently a member of the Class of 1984. In 1979 his other son, Paul, graduated from WPI as an electrical engineer.

His two daughters are also in scientific fields. Jane is working toward her master's degree in food science at North Carolina State University, and Carol will graduate in May as a physics major from Mt. Holyoke College.

Burgarella attends most of the Sudbury town meetings, a form of government he strongly endorses. He enjoys summer gardening, and in winter his free time tends toward energy conservation. His house, which he built himself in the late 1950s, is highly efficient thermally, but he's done some heat exchanger development on his wood stove.

Says Burgarella, "Year-round, auto mechanics is a hobby (necessity?), with so many children in college who have old cars to be kept alive."

John Burgarella, '50, demonstrating the SX-70 Land camera which he helped to develop at Polaroid.

can't beat "the old man." In spite of his 4-day golfing weeks, John remains active in community affairs, goes fishing, plays bridge, travels, and attends meetings of the 1500 U.S. Steel annuitants in the Tampa area. John, who was with U.S. Steel for 42 years, lives with his wife, Evelyn, on the 18th fairway of one of the two golf clubs to which they belong.

Since his retirement in 1971, **Edward Perkins** and his wife, Mildred, have built a summer home in Vermont, wintered in Tavares, FL, and traveled to the Canadian Rockies, Scandinavia, the national parks, the Canadian Rockies, and been around the world in 45 days. They plan to go to Europe this year. Ed still finds time to play golf and claims that building the Vermont house helped him to withstand a heart attack from which he has made a good recovery.

The **Emil Ostlunds** opted to convert their summer house in Pocasset, MA, on Buzzards Bay into an all-season retirement home. "Right in front of our house there is the best shell fishing on the Cape with plenty of clams, quahogs, scallops, oysters and mussels, as well as finny types such as flounder and blue fish." They have caught so many lobsters in their traps that they are tired of eating them. Emil, a consultant, recently completed a job in Spain for a steel company. He also takes on some local jobs. Both of the Ostlunds play golf, but like the change of seasons and don't plan to join the folks in Florida.

John Schatz and his wife, Lillian, enjoy traveling. To date, they have been to Italy, the Caribbean, Austria, Bermuda, Florida and Hawaii. During a 15-day trip to Germany, they attended the Passion Play at Oberammergau. When not touring, they reside in Wynantskill, NY.

Sumner Sweetser retired from Exxon in 1976 and divides his time between Summit, NJ, and Manomet on Cape Cod Bay. When queried as to how long it takes to get used to retirement, his standard answer is, "About two days." In Summit the local Red Cross Chapter, the Old Guard (an assocation of retired business-professional people) and tennis and swimming keep him busy. At Manomet he fishes and tries to keep "all the paint from getting blown off of the house." An occasional fishing trip with **Buck Whittum** is always enjoyable. He says, "'Sub' found it necessary to grab the nearest salt shaker when reading Ostlund's news!"

Gordon Whittum and his wife, Kay, settled in Eastham on Cape Cod after his retirement from American Steel and Wire. "Buck" is active with the U.S. Coast Guard Auxiliary and Kay works for the Society for the Preservation of Cape Cod. He has a boat and trailer for fishing, "But the fish haven't been very cooperative for the last couple of years." Last year the Whittums finally made it to the Canadian Rockies via plane, rail and bus. They found Canada to be a big, beautiful country with congenial people and wildlife everywhere. Enthusiastic about Cape Cod, also, they heartily endorse bike riding on the new Cape Cod Rail Trail, "16 miles of delightful scenery with no hills."

Sumner B. Sweetser, Class Secretary

1934

George Kalista recently retired from the research and development center located at the Naval Weapons Station Earle after 31 years. He had held the positions of ordnance, mechanical, general, industrial and missile systems engineer in the guided missile programs. (The Weapons Station Earle was named in honor of the late Admiral Ralph Earle, formerly the chief of the Bureau of Ordnance and a past president of WPI.)

Over the years, George has been employed by Commonwealth Brewing Corp., U.S. Envelope, Pratt and Whitney Aircraft, and Springfield (MA) Armory, where he was an ordnance engineer for development and test engineering in the research department. Active with WPI alumni affairs, he served as vice president and secretary-treasurer of the Connecticut Valley chapter of the Alumni Association, as well as a high school contact for the former Techni-Forum program.

Currently, George plans to spend the winter months in a "warm climate." He is concentrating on golf with the objective of scoring his age. "I improve on the techniques, but there is still the time slippage factor, so I'll have to be around for a long time."

1936

H.J. Erickson, who is retired from Bethlehem Steel, resides in St. Michaels, MD.

1937

Reunion **June 3-6, 1982**

Iver Rosenlund has retired from du Pont. He lives in Kimberton, PA.

1938

Leo Cronin, a member of the President's Advisory Council at WPI, has been selected to appear in the 13th (1981–1982) edition of *Who's Who in California*. He received a scroll from the Society "in recognition of exceptional

achievement, leadership and service." During his career, he has been with U.S. Gypsum; RCA; Raytheon; and Semicon of California, Inc. In 1963 he founded Spectra-Mat, Inc., which he continues to serve as president and chairman of the board. His firm makes components used in lasers, cancer treatment, satellites, etc. He is also associated with Spectra-Flux, SC Cabling and Relmag Division of EEV, Inc. He has served as president of the Chamber of Commerce and the Rotary. Last year he was named a Paul Harris Fellow. Active in church activities, he also enjoys golf, bowling, biking and jogging.

1942

Reunion **June 3–6, 1982**

1943

Robert Schedin, president and chief executive officer of Fairlawn Hospital, Inc., was elected to the board of trustees of Becker Junior College, Worcester. Formerly he served as director of engineering at Crompton & Knowles.

1945

Sidney Wetherhead has been named marketing director, a new position in the abrasives marketing group at Norton Co., Worcester. Prior to his latest appointment, he managed Norton's technology sales and licensing activity throughout the world.

1946

Paul Gorman, executive vice president of Chas. T. Main, Inc., Boston, has been elected as a fellow by the American Consulting Engineers Council (ACEC) in recognition of highly distinguished professional service and accomplishments. He joined Main in 1975 as vice president and manager of the nuclear power division. He has since served in the same capacity for the thermal nuclear division and as group vice president in charge of engineering and design. Active in Brockton civic affairs, he also is a lecturer in power plant economics and design at the Northeastern University Graduate School of Engineering. Prior to joining Main, he was vice president of the Boston Power Department of United Engineers & Constructors, Inc. and vice president-manager of the Power Department for the Jackson & Moreland Division. The ACEC, to which he has been named a fellow, is the nation's largest organization devoted exclusively to advancement of consulting engineering firms in private practice.

1947

Reunion **June 3–6, 1982**

Last year **Andrew Goettman** was honored as "Plant Engineer of the Year" in North Carolina by the American Institute of Plant Engineers (AIPE) in recognition of his outstanding contributions to the plant engineering field throughout his 35-year career. Currently, he is plant engineer at Lorillard in Greensboro, NC, where he is responsible for maintenance, construction, security, power plant operation, energy conservation, groundskeeping and waste management.

At the present time, he is a registered professional engineer in several states. He is a certified plant engineer and a past president of the Piedmont Chapter of the AIPE. He serves on the board of governors for the North Carolina Professional Engineers and is a director of his local chapter and chairman of the nominating committee.

Of his job, Goettman says, "Plant engineering is the complaint department. My principal challenge is making our services timely and satisfactory to all the other departments."

Goettman and his wife, Dorothy, who enjoy playing golf, are the parents of four daughters and one son. In his spare time he likes to restore old cars, and is especially fond of 1960–65 Chrysler products. "With five children I get plenty of practice maintaining and servicing all the family vehicles."

1948

Carl Hershfield recently received the Electronic Industries Association's 1981 engineering award of excellence. He is an engineering support manager at GTE Sylvania, Needham, MA.

1949

Homer MacNutt, Jr., vice president for manufacturing of the Morgan Construction Co., has been elected a new trustee of Hahnemann Hospital, Worcester.

1950

Last July the **Bill Bowens** spent two weeks cruising Alaska and had a seaplane flight over the ice cap. Bill is opening up a consulting business.

Francis Norton continues as a construction superintendent at Monsanto in Alvin, TX.

1952

Reunion **June 3–6, 1982**

William Cimonetti, still with GE, is now general manager for the firm in Burlington, VT.

1954

Milton Meckler of the Meckler Group, Encino, CA, was slated to speak at the Third International Symposium on Energy Conservation in the Built Environment in Dublin, Ireland, in March. He was to discuss his firm's manual computation program originally developed for estimating building energy requirements for the California Energy Commission. In January he spoke on the opening day of the Fourth International Conference on Thermal Insulation in Millbrae, CA. His new book, *Retrofitting for Energy Conservation*, which he co-authored, is scheduled for publication in 1982. Recently he was appointed to the part-time faculty in the Mechanical and Chemical Engineering Department at California State University, Northridge, where he teaches a course called "The Environment in a Technological Society."

Edwin Prantis serves as construction manager at Ebasco Services Incorporated in New York City.

1957

Reunion **June 3–6, 1982**

1958

Dr. **Shelden Radin**, a member of the Physics Department at Lehigh University, Bethlehem, PA, is the co-author of a textbook titled *Physics for Scientists and Engineers* just published by Prentice-Hall. The book is meant to be used for the introductory physics course taken by most college engineering and science students in their first years in college, or by high school students in calculus-based advanced placement physics courses. As a co-author Radin writes: "In our experience some students are overwhelmed by physics because they treat each topic as if it were a separate subject. To try to overcome this tendency, we point out the interrelationships that emphasize the unity of physics."

1959

On January 1st, Dr. **Joseph Bronzino** became chairman of the Engineering Department at Trinity College in Hartford, CT. He remains director of the Greater Hartford Center for Biomedical Engineering Education which includes Trinity College, the Hartford Graduate Center, Hartford Hospital, Saint Francis Hospital and Medical Center, and the University of Connecticut Health Center. Joe is looking forward to the publication of his second book, *Computer Applications for Patient Care*, by Addison-Wesley this spring.

Oscar Hawley is dean of St. Katharine's- St. Mark's School, a high school in Bettendorf, IA.

Peter Nelson has been named the 1981 Engineer of the Year by the Westmorcland County Chapter of the Pennsylvania Society of Professional Engineers.

1960

William Fenwick is director of operations at Trans-National Technologies, Inc., New York City.

Sang Ki Lee, an attorney for the International Division of Motorola, Inc., writes "I have had to orchestrate a situation in Korea for our management over the last seven months which involved shuttling back and forth between Chicago and Seoul. Now the situation is on track and we are making progress. It was one of my most challenging and rewarding experiences." His wife, Helen, is very much concerned with her work at NW Community Hospital.

Bob Mercer continues as principal in Mercer Associates, a manufacturer's representative organization for the power generation and environmental systems industries. Bob and Janet, who have a son, 16, and a daughter, 14, live in "beautiful" Charlotte, NC. "We would like to make the 25th."

Paul W. Bayliss, Secretary

1962

Reunion June 3–6, 1982

John Peterson, Jr. continues as a tire development scientist at BF Goodrich in Akron, OH.

The Rev. **Andrew Terwilleger** of Lexington, KY, started a one-year term as Kiwanis lieutenant governor in October. In this capacity he is responsible for administration of the Kiwanis Division, which includes 15 Kiwanis clubs in six counties. Andy is head agent for the Class of 1962.

1963

With the Kodak Research Laboratories, Rochester, NY, since 1968, Dr. **Harry Hoyen, Jr.** has participated in a broad spectrum of research activities in basic studies of silver halides and in applied research for product development. In solid-state technology, Harry has applied the concept of space charges to the study of ions of silver halides. He has an MS in chemistry from WPI, as well as a PhD in materials science and engineering from Cornell.

1964

Christopher Almy recently returned home after a stint at Ft. Monmouth, NJ. He still attends classes once a week and has two weeks of active duty once a year. He continues with Knolls Atomic Power Laboratory in Schenectady, NY. He and Margie have three children, all in "gifted" programs, and reside in Scotia.

Richard Ryczek has been named as the recipient of the Frank Quinn Memorial Award awarded by the Purchasing Management Association of Syracuse and Central New York. Ryczek, who was cited for his work on the education committee, serves as manager of systems purchasing at Niagara Mohawk Power Corp., Syracuse. He has been a member of the association since 1974 and has held the post of chairman of the committee on certified purchasing management for the past three years. A licensed professional engineer, he also holds an MS degree in industrial administration from Union College.

1965

Dr. **Donald Kerr** continues with the Black-and-White Photographic Division at Kodak Research Laboratories in Rochester, NY. Since joining the laboratories in 1969, his activities have ranged from computer modeling studies for instrumentation design for a blood analyzer to investigations of film processing kinetics. The author of several papers, he also has a patent application pending. He has a PhD in chemical engineering from the University of Delaware.

Dr. Richard Iacobucci, '63, surveying part of Nature Preserve, Inc, Pembroke, MA, which he serves as director. He is using his Harvard law degree "to battle myopic town assesors who refuse to grant tax-exempt status to a deserving wildlife sanctuary." He is president of Roctronics Entertainment Lighting.

1966

MARRIED: William R. Nims to Christine E. Hazlett on October 24, 1981 in Winthrop, MA. Mrs. Nims graduated from Katharine Gibbs School.

Joe Acker was recently promoted to plant manager at the FMC Corp. plant in Nitro, WV.

Woody Adams is now vice president of Kleinschmidt & Dutting, Pittsfield, ME.

Bill Baker serves as production manager at the American Hoechst nylon plant located in Manchester, NH. Says Bill: "My primary responsibility is providing clean towels for union stewards to cry on."

For the past five years **Brian Belanger** has been a member of the technical staff at Motorola's Government Electronics Division in Scottsdale, AZ. He works in the area of radar systems design.

Lynn Biuckie is currently project manager for the design and installation of a new continuous heat treating line for the Corporate Engineering Department of Bethlehem Steel in Bethlehem, PA.

Previously with Beecham Products, Rockwood, MI, **Paul Castle** now holds the post of vice president and general manager of William C. Meredith Co., East Point, GA. He has an MBA from Tuck School at Dartmouth.

Bob Coates is employed as a district sales engineer covering the southeast from Virginia to Florida for the Special Products Division of The Torrington Company.

Last year, after 14 years with Raytheon, **Jeff Cheyne** accepted a post at the Foxboro (MA) Co., where he is involved with advanced process automation and test.

Jim Cocci continues as a program manager with Sanders Associates, Nashua, NH. His assignment includes management of the submarine business area of the Special Program Division, which specializes in signal exploitation systems for military applications.

Bill Collentro is an elected town meeting member from North Falmouth, MA. Professionally, he serves as the New England regional manager of Vaponics in Plymouth. He performs consulting engineering and design work for water purification systems.

Ron ("The Hawk") **Crump** writes: "Went with Combustion Engineering out of college, and I'm still with them." During his career he has started up electrical power plants in the U.S. and overseas. Now he is a project manager at the home office in Windsor, CT.

Sig Dicker holds the titles of principal engineer in the Facilities Engineering Department and facilities program manager for the Saab-Fairchild 340 Aircraft Project at Fairchild-Republic Co., Farmingdale, NY. He and his wife are the founding and managing partners in Dicker Associates and HD Associates, "two up-and-coming related companies dealing with real estate investment and property management."

Al DiPietro, who lives in a passive solar home that he planned, is now a senior construction

A Better Mousetrap?

You know that old saw about a better mousetrap? Well, Frederic Stevens, '61, and his Vantage Computer Systems have definitely come up with a better one.

Vantage, a small but growing Hartford-area firm, designs computer programs for some of the newest insurance investment plans of insurers such as Prudential, John Hancock and New England Mutual. Vantage is spearheading software for the industry's new "universal life" plan, which allows the buyer to obtain death benefits as part of a high yield investment package.

"Vantage has the jump on all of its competitors in universal life programming," says an industry executive. "They have no peers."

To date, some 31 insurers have bought Vantage-designed computer programs for universal life plans. Another 100 use Vantage programs for annuities, recording the payments which annuitants make into the funds they plan to draw upon in the future, and tracking the interest earnings built up by those funds. The firm's client list has been growing by about 15 companies a year.

Vantage was started in 1970 when Robert S. Maltempo, now president, and Frederic Stevens, executive vice president, left jobs at Aetna Life & Casualty and pooled their $12,500 savings to stake their new venture. Maltempo, who holds an MBA from the University of Connecticut, became Vantage's chief salesman, while Stevens, with a degree in physics from WPI and a master's in computer science from the Hartford Graduate Center, became the technical expert.

The enterprising pair put Vantage into the forefront of computer programming design, creating systems that made the insurers' in-house systems technically obsolete. Said one insurance company vice president of his own in-house setup, "As variations on annuity products began to be marketed, the turnaround time to build them into the system became greater than the traffic could bear. We found that the design concepts and cost advantages we wanted to move toward were already embodied in the Vantage system."

The bottom line for Vantage? Flourishing revenues, leaping from $750,000 in 1978 to over $4 million in 1981; and a payroll supporting over 90 employees, up from just 12 in 1976. In fact, senior programmers have been signing on at a rate of three a week.

engineer at Limerick Nuclear Generating Station for Bechtel Power Corporation. He is located in Boyertown, PA.

Gary Dyckman enjoys his new post as manager of projects in the Boston offices of Cygna Energy Services, which provides engineering services to the electric utility industry. In a little over a year he's helped increase the Boston staff from 35 to 135.

Steve Erhard is concerned with digital hardware and software at Fairbanks Scales in St. Johnsbury, VT. In his spare time he goes winter camping and is active with Big Brothers of America.

Ralph Fiore, who joined Western Electric, North Andover, MA, after graduation, is now a department chief. His group supports a variety of computer-based systems deployed throughout the Bell System.

Kit Foster has been employed at the Naval Underwater Systems Center, New London, CT, since 1966. At the present time, he is a systems engineer for the Submarine Integrated Communications System for future generation submarines. At home in Gales Ferry, he is treasurer of the Volunteer Fire Company.

Brendan Geelan has spent his career to date with UniRoyal Chemical, where he is currently group leader for process development in the New Products Department.

Since graduation, **John Gilbert** has been with Pratt & Whitney Aircraft. Today he heads a group of quality engineers charged with updating quality control techniques not only for his firm, but for all critical parts made by its suppliers. He holds a Juris Doctor degree from Western New England College School of Law and is a member of the Connecticut Bar.

George Grimmell continues with the Service Division at Bethlehem Steel's Burns Harbor plant in Indiana, where he's been employed since 1966. Two years ago he was promoted to assistant master mechanic of the hot strip mill.

Ron Hayden, the current president of the Boston Section of the Instrument Society of America, still works in the area of process control instrumentation. For the past five years he has been with New England Controls, Mansfield, MA, a firm which represents Fisher Controls and other companies.

Bob Holt, who has three marathons to his credit, hopes to someday run a "50-miler." He serves as senior associate with Ocean Data Systems Inc., Rockville, MD. The firm provides programming analysis, software engineering, and consulting services to the Navy in the field of sonar performance prediction modeling.

Phil Hopkinson still holds the post of manager of engineering for the Specialty Transformer Department at GE in Fort Wayne, IN.

Dave Johnson has been named general foreman of electronic services at Armco's Middletown (OH) Works.

After more than three years as assistant superintendent of schools-business manager, **Edward Kazanjian** has resigned from the Billerica, MA, school system to take a post in private industry.

Chuck Knothe is a system development project leader for du Pont in Wilmington, DE. A couple of years ago he received his JD from Delaware Law School. Having been admitted to the state bar, he is now developing a private practice.

Continuing with Niagara Mohawk Power Corp., **Andy Kudarauskas** now holds the post of supervisor of gas distribution. He is responsible for all natural gas construction and maintenance.

Recently **Grant Maier** was promoted to project engineer at Pratt & Whitney Aircraft, where he has been employed since graduation. He is responsible for heat transfer, cooling, and performance optimization important to the success of the company's advanced gas turbine engines. While under contract with the FAA, he co-authored a book on design and testing of anti-icing systems for turbine engines.

Jim Maroney serves as president and treasurer of Francis H. Maroney, Inc., mechanical contractors. He is also president of the Kiwanis Club in Haverhill, MA.

Andy Moran, who during his career in public administration has worked for the courts, police, and district attorney, is now director of budget and analysis for the Public Utilities Commission in San Francisco.

Dick Nelson's company, Nelson Oil & Gas Co., is located in Shreveport, La. His business is concerned with leasing, drilling and producing oil and gas properties in North Louisiana and East Texas. Dick operates two rigs capable of depths from 5000 to 12,000 ft.

Stu Nelson continues as principal in his manufacturers' representative business, Nelson-Scribner Associates, Norwood, MA.

Currently, **Ray O'Connell, Jr.** serves as project manager for displays in the ultrasound imaging group at Hewlett-Packard, where he has been employed since graduation. He holds an MBA from Northeastern University and lives in Andover, MA.

For the past three years **Ted Pero** has been coordinating the installation of Pratt & Whitney Aircraft jet engines with Boeing, Douglas, Lockheed and Airbus. "This has taken me from San Diego to France." He and his family reside in Somers, CT.

At the present time, **Paul Peterson** holds the post of manager of the field support staff for Software AG of North America. A resident of Evergreen, CO, Peterson writes: "Our house is located near the top of a mountain at 8,400 feet above sea level. The air is thin, but the fishing, hunting and skiing are excellent!"

Jay Segal has been with Rosenman Colin Freund Lewis & Cohen in mid-town Manhattan since graduating from St. John's University Law School. He also holds an MBA degree from Long Island University.

Bob Shaw owns and operates a small used car business in Worcester.

Tom Shepelrich holds the position of chief estimator at J.A. Jones Construction Co. and its sister company, Metric Constructors.

Robert Sinuc is now the production section manufacturing manager for the GE Silicone Product Division, which he says concentrates on high quality Silly Putty.

Currently, **Pete Sommer**, a graduate of American University Law School, is in private practice specializing in patent, trademark, copyright and unfair competition law in Buffalo, NY. He has passed the Patent Office bar exam and the New York State bar exam, and has been admitted to, among others, the U.S. Supreme Court and several Courts of Appeals.

Dave Stone, a plastics processing engineer at Rohm and Haas Co., Bristol, PA, specializes in the technical service requirements for injection molding markets related to the company's acrylic and soda bottle resins.

Bob Thompson now heads an 18-man Civil and Structural Engineering Branch for the Chesapeake Division of the Naval Facilities Engineering Command. He has been employed by the Navy in Washington, DC, area in several different capacities since graduating from WPI.

Jerry Toupin serves as plant manager for the Torrington Division of Ingersoll-Rand Co. at the firm's bearings plant in Cairo, GA. Married and the father of two daughters, he enjoys skiing, sailing and golf.

"Graduate work at Penn State led to an MS and PhD in biophysics, as well as five years of excellent golf and football mania," reports **Doug Vizard**. Currently he is assistant physicist and assistant professor of biophysics at the M.D. Anderson Hospital and Tumor Institute and at the University of Texas Graduate School of Biomedical Sciences in Houston.

Leonard Weckel is employed by Spotts, Stevens, and McCoy, a consulting engineering firm in Wyomissing, PA.

At the present time, **Joe Whalen** holds the position of senior program director of an ASW technology group in ORI's Strategic Systems Division. He has a PhD in physics from the University of Florida.

Malcolm White, who married his wife, Nancy, two years ago, enjoys living by the ocean in Marblehead, MA. He continues as a lieutenant commander in the Naval Reserve, Professionally he is a supervisor of a pilot coating operation for Polaroid in Cambridge.

Bob Wilson serves as a process engineer at Arwood Corp., Tilton, NH. The firm produces aluminum, copper and magnesium base investment castings for aerospace and commerical markets.

J.K. Wright holds the position of national marketing manager of food phosphates at Stauffer Chemical Company and recently celebrated his 15th anniversary with the firm.

Joe Wright writes: "Our family is heavily involved in competitive, long-range shooting." He is second in command of the Massachusetts shooting organization, the IHMSA. For the past six years he has been chief engineer of ball valves at Jamesbury Corp., Worcester.

1967

Roger Binkerd won first place in a recent National BMW Motorcycle Contest. As a result, Roger and his wife, Janet, spent 23 days last summer touring in Europe through the Alps on a motorcycle. Roger is still with Aquatec, Inc. in South Burlington, VT.

Lt. Col. **David Heebner**, his wife, Bonnie, and children, Heather and Jason, are looking forward to returning to the States this summer after spending three years with the U.S. Army in a small town near Frankfurt, Germany.

Denis McQuillen was the author of "Design and Testing of Pharmaceutical Sterile Rooms" which appeared in the November issue of *Pharmaceutical Technology*. He is vice president of corporate engineering at Gulf & Western Corp., New York City. Most recently he was senior project manager for E.R. Squibb & Sons. He holds an MSME from WPI, as well as a BS, and formerly served as a graduate assistant at Alden Research Labs. A member of the American Society of Heating, Refrigerating and Air-Conditioning Engineers and the American Society of Medical Engineers, his principal research interest is the design and testing of sterile rooms.

1968

Robert Najemy, Jr. is director of the Helianthos Yoga Union in Athens, Greece.

Dr. **Louis Strong** was recently appointed by Harvard University as director of the Gordon McKay Laboratory and assistant director of the Division of Applied Science. Previously, he was research scientist at MIT. He holds degrees from Brown and the University of Michigan, as well as from WPI.

1969

Currently **Leslie Hatch** serves as group director of environmental studies at Engineering-Science, Inc., Atlanta, GA.

1970

BORN: to Sally and **Frank Vernile** a daughter, Heather Ann, on September 25, 1981. The Verniles still live in East Hartford, CT, with their two-year-old daughter, Sarah Marie.

The **J. Geils** Band performed to a standing room only audience at E.M. Loews Center for the Performing Arts in Worcester in December. One reviewer wrote that the performance "rivaled The Rolling Stones' guerrilla concert held last fall at Sir Morgan's Cove."

James George is a process control engineer at General Electric Plastics in Selkirk, NY.

Daniel Lewis works as a development engineer at Fiber Industries, Florence, SC.

Howard Norcross has been appointed to a three-year term on the town finance committee in Chatham, MA. A native of Chatham, he is a partner with his father in C.E. Norcross and Son, a building firm. He has an MBA from Purdue University. Before returning to his home town some ten years ago, he worked for Mobil Oil in New York City.

1971

Joseph Bellino holds the post of program manager of automation systems at GE in Bridgeport, CT.

Todd Benjamin serves as manager of gas turbine service at GE in Schenectady, NY. He and Wendy have two children and live in Scotia.

George Block, Jr. has been promoted to director of engineering at New Haven (CT) Water Co. He joined the utility in 1971 and was previously deputy director of engineering. His new responsibility includes management of the company's long-range engineering planning and capital improvements program, which amounted to more than $11 million in 1980. The past president of the Connecticut Society of Professional Engineers, Block is a registered professional engineer in Connecticut. He belongs to the American Water Works Association and the Connecticut Water Works Association, whose conservation committee he chairs. He is president of the Jaycees in Southington, CT, where he lives with his wife, Bethany, and two daughters.

Joseph Carter, MD, continues with the Euclid Clinic Foundation, Euclid, OH.

Greg Dickson is involved with adult soccer, men's slowpitch softball, volleyball, rowing, running and hunting. He is still with Dow Chemical in Midland, MI.

Dr. **Baljit Gambhir** works for Shell Oil Co., Houston.

Leo Gillis, Jr., a registered professional engineer with the New England Power Service Company, Westboro, MA, is a member of the N.E. Power Golf League.

Sailing, skiing, and traveling are some of the pastimes of **Michael Gitlen**, an employee of Kaman Corporation, Bloomfield, CT. He has a CPA, an MBA and an MS in accounting.

William Helliwell, Jr. continues with Riley Stoker in Worcester. He received his MBA from the University of Denver. The Helliwells have one child, Allison, 2.

Bhagat Indravadan is still with Corrosion Control Services in Bombay, India. He has an MBA in management information systems, is married, and the father of one. Tennis and swimming are two of his favorite activities.

Philip Johnson has returned from Bermuda where he attended an Optical Manufacturers Association meeting. He works for Gentex Corp. in Dudley, MA.

Stephen Katz of Intel Corp. recently facilitated WPI's receiving a complete Intellec floppy-disc based computer system for developing software and testing microprocessor designs from Intel, which is located in Santa Clara, CA. The system is worth over $20,000 and will be available to all WPI students.

Coaching soccer, chemical safety and travel are some of the interests of Dr. **James Kaufman** of the Science Division at Curry College, Milton, MA.

Myles Kleper, who has an MBA from Northeastern, works for Abcor in Wilmington, MA.

Mark Koretz is employed at Advanced Micro Devices, Burlington, MA. He earned his MBA at Northeastern University.

Joseph Laptewicz's pastimes include sailing, golf and travel, as well as running. He has a baby son, Nicholas, and works for Pfizer in Groton, CT.

Currently, **Bruce Leffingwell** is employed by Olin Corp. of New Haven. He and his wife, Karen, live in Wilton and have three children. After hours he enjoys woodworking.

Bill Light holds an MS and PhD from the University of California at Berkeley. He continues with Abcor, Wilmington, MA.

Jay Linden of Cape Cove Corp., Rotonda West, FL, reports that his interests lie with racquetball, softball, football, coaching and the Tampa Bay Bucs. He is a professional civil engineer.

Richard Lisauskas works for Texas Instruments in Attleboro, MA. He has a master's in ceramics from MIT and is now studying for his MBA at Bryant.

Sailing and camping are some of **Ed Lowe**'s leisure time activities. He continues with GE in Schenectady. He and Judy have a daughter, Beth, 3.

John Marino and his wife, Patricia, have a

baby daughter, Lisa. Marino is with UNC Resources in the Naval Products Division at Uncasville, CT.

Richard Mattes belongs to the Hanover Sociables Club and participates in model shipbuilding, tennis and "most other sports." Located in Hanover, MA, he is employed at New England Telephone in Boston.

Thomas Mirarchi, who has an MBA from RPI, works at American Optical Corp., Framingham, MA. He and Ellen were married last July.

Building passive solar houses is one of the pastimes of **John Moore III**, a resident of Mendota Heights, MN. He is employed at MTS Systems Corp., Minneapolis.

Andy Muir, Jr. serves as a sales representative for Buffalo Forge Company, Kansas City, MO. After hours he enjoys golf, skiing and tennis.

The Worcester Art Museum, classical music and carpentry are some of the interests of **Frederic Mulligan**, who is with Cutler Associates.

John Niestemski continues with General Electric in Syracuse, NY.

Gerald Orre is president of Audio Visual Service Co., Inc., Worcester. He serves as a captain with the U.S.A.R. and enjoys scuba diving.

"My major activity seems to be commuting to and from work," writes **Robert Payne**. He lives in Solon, OH, and commutes to Standard Oil in Cleveland. He also reports that he shovels plenty of snow and is interested in piano and voice, as well as basketball and history.

Robert Pettit works for Doron Precision Systems, Binghamton, NY. He is active with his church, foster parents program and model railroading.

John Plonsky scouts football for his local high school. He also belongs to the American Helicopter Society. Professionally, he is with the Sikorsky Aircraft Division of UTC. He has an MBA.

Cdr. Peter Kudless, '66 (right) receiving colors from Cdr. Kenneth Olsen, '63 (left).

Kudless Takes Seabee Command

When the colors were passed in the impressive Seabee change-of-command ceremony held at the Naval Air Engineering Center (NAEC) in Lakehurst, New Jersey last September, they passed from one WPI alumnus to another. Cdr. Peter J. Kudless, '66, Civil Engineer Corps, USNR-R, received the colors and the command of 762 officers and men of Reserve Naval Mobile Construction Battalion 21 from Cdr. Kenneth Olsen, '63.

During the ceremony, outgoing Cdr. Olsen was praised by his superiors for his achievements and leadership during the past two years as commanding officer. Incoming Cdr. Kudless then took command of the largest Navy activity at NAEC: Reserve Naval Mobile Construction Battalion 21.

Previously, Cdr. Kudless served with the Public Works Department at Perth Amboy, New Jersey and held various billets with RNMCB-13. Among his many decorations are the Navy Commendation Medal with Combat "V" Meritorious Unit Commendation, Vietnam Service Medal with Silver Star and the Vietnam Campaign Medal.

In civilian life, Kudless, a professional engineer, serves as the Project Construction Manager at the Hope Creek Generating Station in Salem County for New Jersey Public Service Electric and Gas. Ken Olsen is a patent attorney for Schlumberger Limited, Ridgefield, CT.

Playing and teaching jazz music are pastimes for **Bob Sinicrope**. He is with Milton Academy, Milton, MA.

Donald Swartz, a doctor of chiropractic, has opened his practice on Main Street in Newport, NH. He is a graduate of the National Chiropractic College in Lombard, IL, one of the country's few accredited chiropractic colleges. He holds a BS degree from the University of Massachusetts, where he spent four years doing graduate research in genetics.

Robert Trachimowicz works for Ebasco Services in Houston and is married and the father of Timothy, 4, and Matthew, 2.

Michael Turek, often involved with golf, swimming and home projects, is with Monsanto in Lima, OH.

Last year **William Verrelli** received his BA in English at Framingham State College. He works for Dennison Mfg. Co., Framingham, MA. Activities include running, chess, wine collecting and bowling.

Francis Wehner, Jr. continues with General Dynamics Electric Boat Division, Groton, CT.

Thomas Werb, also with Electric Boat, resides in Warwick, RI, with his wife, Marsha, and daughters, Jennifer and Allison. He enjoys racquetball and model trains.

Robert Woollacott works for Curtis 1000, Inc., Smyrna, GA. He holds an MBA from the University of Connecticut.

1972

Thomas Huard is employed as a technical representative at Waters Associates, Inc., Milford, MA.

1973

BORN: to Janice and **Robert J. Zawada** their second daughter, Rachel Elizabeth, on January 7, 1982. Bob is currently an assistant actuary in the Pension Trust Department at Sun Life of Canada's U.S. headquarters in Wellesley, MA. He and his family reside in Ashland.

William Catlow holds the post of manager of bucket and rotor development at General Electric in Fitchburg, MA.

Leon Horne is an analyst at Sonalysts, Inc., Waterford, CT.

Recently **Warren Smith** accepted a post with Atlas Supply Company in Springfield, NJ. He specifies and tests tires, batteries and other automotive replacement parts.

1974

Alden Bianchi has become an associate with the Worcester law firm of Gilbert & Coblentz. He holds degrees from Suffolk University Law School and the Georgetown University Law Center. Previously he practiced in Chicago and Washington, DC, and served as an assistant counsel to the U.S. Senate Committee on Foreign Relations. He specializes in tax and related business law.

Mehrdad Habib serves as a structural designer at Stone & Webster in Boston.

Lt. **Linda Woodward**, who was commis-

sioned a 2/Lt. in the USAF on December 3rd, is now attending the University of Missouri and studying for her EE degree.

1975

MARRIED: Toby Reitzen and Jim Sachen in Denver, CO. on June 27, 1981. The bride, who holds a master's degree in chemical engineering from MIT, works as a reservoir engineer for Mobil in Denver. The groom, a planning analyst, also is employed at Mobil and has degrees in physics and petroleum engineering from UCLA and Louisiana State University. **Vicki Cowart** was an attendant at the wedding.

BORN: to Barbara and **Richard Newhouse** a daughter, Jessica Marie, December 29, 1981. . . . Barbara and **Charles Riedel** a son, Michael Charles, on March 23, 1981. Riedel serves as a traffic engineer for the New York State Department of Transportation, where, under a federal grant, he wrote the department's Traffic Signal Installation Manual.

After a year in England with Esso Engineering, **John** and **Virginia Giordano Fitz-Patrick** were looking forward to a visit to the States over Christmas. Ginny writes: "We're really enjoying being so close to Europe. Our plans are to ski in Switzerland this winter. If that goes smoothly with the two children, we'll try to see as much of Europe as possible before returning to the U.S. next fall."

Last year **William Kelly** received his PhD in chemistry from Dartmouth College. His thesis was entitled: "Conformational Studies of H-F and C-F Spin-Spin Coupling." Currently he has a postdoctoral post at Purdue University where he is pursuing further studies.

1976

MARRIED: Stephan R. Divoll to Michele E. Naujalis recently in Taunton, MA. Mrs. Divoll, a rehabilitation counselor at Paul A. Dever State School, received her degree in psychology from Southeastern Massachusetts University. The groom is employed by Texas Instruments, Inc., Attleboro, MA. . . . **John Kowalchuk III** and Dianne Budney on October 9, 1981 in Sutton, MA. The bride is a management consultant in EDP for Arthur Young & Co., Worcester. She graduated from Holy Family College, Philadelphia, and Worcester State College. Her husband is a communications engineering consultant for Mitre, Bedford, MA.

Kent Baschwitz is now a senior sales engineer at Mobil Oil Corporation, Special Products Department, Scarsdale, NY.

Jeremy Brown has been promoted to director of group pension product development at State Mutual in Worcester. In 1980 he received the fellow of the Society of Actuaries (FSA) professional designation. He joined State Mutual as an actuarial assistant in 1976. Two years ago he was promoted to assistant actuary.

Gary Helmstetter serves as a project leader at Redac, Littleton, MA.

1977

Christopher Baker is with Andrews & Clark in Nashua, NH.

Paul Cullen serves as a consultant in robotics at GE in Schenectady.

Bill Cunningham recently returned from an 18-day trip to Japan to investigate the Japanese computer industry for Pactel. "I arrived in the middle of a holiday and industry was totally closed down for several days," he reports. He spent his unexpected free time sightseeing and getting a taste of Japanese culture. When not traveling or skiing ("Snow is great up north"), Bill attends the Tuck School at Dartmouth.

Brian Kisiel continues as a technical specialist for Betz Laboratories. He and wife Donna are located in North Hampton, NH.

William Lee holds the position of a programmer-analyst at McFann-Gray & Assoc., San Antonio, TX.

Tony Theoharides has been commissioned a captain in the Army's Medical Service Corps. Recently he received his PhD at Clark University.

1978

MARRIED: Robert A. DeBoalt to Patti-anne Madden on May 22, 1981 in Middleton, MA. The bride graduated from Burdett Business School, Boston, and is employed in the Adoption Unit of the State Department of Social Services. Her husband is with Varian Beverly, Beverly, MA. . . . **Thomas J. Dow** and Carolyn B. Colby on October 11, 1981 in Swampscott, MA. Mrs. Dow, a musician and flute instructor, graduated from Ithaca College and Boston University. The groom teaches at Saugus High School.

Rick Diamond, who has been with Fafnir Bearing for nearly four years, was recently promoted to shipping center manager of the firm's Pulaski, TN, plant.

Peter Hayden is staff manager of marketing at AT&T Long Lines, Bedminster, NJ.

Russell Warnock is currently an engineer officer at Picatinny Arsenal in Dover, NJ. An officer with the U.S. Army Corps of Engineers since graduation, he will be released from active duty in June.

1979

Paul Blackmer is an industrial engineer with GE in Utica, NY.

William Donoghue works as an electrical design engineer for Hamilton Standard in Windsor Locks, CT.

Thom Hammond serves as a sales engineer for the Masoneilan Division of McGraw Edison Co., Norwood, MA. "Recently finished a business related tour of the U.S. Total time on the road: eight months."

In January **John Mortarelli** and his wife, Dr. Elizabeth Smola, both affiliated with the Stop It group hoping to discourage the building of a hazardous waste treatment plant in Warren, MA, spoke before a group of concerned citizens in Wales, MA. Mortarelli holds a BS in physics from the University of Massachusetts, Amherst; a master's in math from the University of Connecticut, Storrs; and a master's in biomedical engineering from WPI.

Donald Patten works as a process supervisor at Procter & Gamble Mfg. Co., Quincy, MA.

1980

MARRIED: William P. Durkin to Barbara C. Strahan in Arlington, MA, on October 14, 1981. Mrs. Durkin has a degree in computer information systems from Bentley College. The groom serves as a mechanical engineer at The Foxboro Company. . . . **Arthur J. Flagg III** and Maureen F. Haggerty in Worcester on September 11, 1981. Mrs. Flagg attended Worcester State College and is a manager at Iandoli's Food Village. The bridegroom did graduate work at Northeastern University and is currently with GTE Products Corps., Needham,

neer at E.D.S. Nuclear, a subsidiary of Impell Corp., San Francisco.

Ethan Luce is employed as a design analysis engineer at Sikorsky Aircraft, Stratford, CT.

Brian McLane works as a design engineer at Lexidata Corporation in Billerica, MA.

Jennifer Pollard is an assistant civil engineer for the New York State Dept. of Transportation.

Stephen Superson is a design engineer for Teledyne Engineering Services, Waltham, MA.

Gary Sylvestre serves as a project manager at Barclay's American Business Credit, Inc., East Hartford, CT.

Jeffrey Wakefield is product manager at Data Terminal Systems, Maynard, MA.

1979

MARRIED: **Gary Doyle** and Janet Stark last September. Both are senior associate engineers at IBM in Essex Junction, VT. . . . **Earl B. Ingham** and Cheryl L. Nugent on January 9, 1982 in Granby, MA. The bride, an ophthalmic technician for Dr. Robert Donohue, graduated from Holyoke Community College. Earl is employed by Aetna Life and Casualty Co., Springfield, MA. . . . **George R. Tompsett, III**, and Carla Ann Ranney in Broad Brook, CT, on April 24, 1982. Mrs. Tompsett graduated from Windsor Locks High School and is an operations clerk for Hamilton Standard Division of United Technologies, Windsor Locks, CT. George is a process and methods engineer at Hamilton Standard.

BORN: to Andrea and **William R. Herman** a son, Bryan William, on March 31, 1981. Herman is now a senior staff member at Arthur Andersen Company, Hartford, CT.

Jeff Boike continues as a manufacturing process engineer at UOP in McCook, IL. He and his wife, Mary Lynn, reside in Hinsdale.

Glenn Braunstein holds the post of development engineer at Goodyear Tire & Rubber Co., Akron, OH.

John Donahue is employed as an electric studies engineer at Niagara Mohawk Power Company, Syracuse, NY.

Donna Graves is systems marketing manager at Digital Equipment Corp., Merrimack, NH.

Bruce Jenket, who was promoted to lt.j.g. last November, has returned from deployment in which he visited Japan, Guam, Hong Kong and the Philippines. Currently he is an assistant in the Reactor Controls Division of the U.S. Navy, stationed at Pearl Harbor.

Donald Larson works as a product marketing specialist at GCA Corporation. He is located in Bedford, MA.

Jeff Mills designs oil refineries for UOP, Inc. He resides near Chicago.

Gary Pearson serves as New England sales representative for Priam Corporation of Needham, MA.

Ronald Roth is employed as a product engineer at Honeywell in Lexington, MA.

Lt. **Jason Tuell** serves as a numerical prediction meteorologist for the USAF at Offutt AFB, NE.

George Wespi continues as an associate engineer at Riley Stoker Corp., Worcester.

Priscilla Young is studying for her master's degree in environmental engineering at Cornell University.

1980

MARRIED: **Robert W. Dreyfoos** and Martine B. Vray in Worcester on September 26, 1981. Mrs. Dreyfoos, a graduate of Worcester State College, is an inspector for the Palm Beach (FL) County Health Department. He is a design engineer for Photo Electronics Corp., West Palm Beach.

Mihran Aroian is a research technician at WPI.

Theodore Crowley holds the post of manager of language products at C.S.P. Inc., Billerica, MA.

David Fox works as a software engineer at Digital Equipment Corp., Merrimack, NH.

Currently, **Richard Goldman** is a student at the University of Connecticut School of Law in West Hartford.

Michael Herberg continues with GE in Schenectady. Earlier he had been assigned to the Waterford plant.

Arthur Huggard, process engineer at Monsanto Plastics & Resins, Springfield, MA, recently received the Monsanto Employee Achievement Award.

Stephen Kmiotek is a chemical engineer at Cabot Corp. He is located in Billerica, MA.

Kenneth Mandile holds the position of vice president at J.B.M. Swiss Screw Co., Inc., Waltham, MA.

John Roche, still with Micro Networks, is now thin-film engineering supervisor at the Worcester firm.

Doreen Savieira holds the post of planning engineer at Western Electric Co., North Andover, MA.

Jeffrey Smits continues as a member of the technical staff at Bell Labs in Holmdel, NJ.

Mike Stone continues as associate editor of **Car & Driver's Buyers Guide** and **Cars** magazine. He is also vice president of TMS Computer Services and the author of two books: **Mopedaller's Handy Manual** and **Your Four**, a guide to four-cylinder motorcycles. The Stones reside in Danbury, CT.

David Sulkin serves as a design engineer at Hamilton Standard, Windsor Locks, CT.

James Torrey, Jr., serves as a maintainability engineer at Digital Equipment Corp., Marlboro, MA.

Marianne Wessling continues as a doctoral candidate in the department of biophysics and theoretical biology at the University of Chicago.

Lisa Wylie is a staff member at Western Electric Co., North Andover, MA.

1981

MARRIED: **Richard F. Condon, Jr.**, and Linda J. Michaud in Townsend, MA, on April 24, 1982. Rich is a photographic engineer at Kodak, Rochester, NY. . . . **David R. Lamborghini** to Helen Aadland in Fairhaven, MA, on January 9, 1982. Mrs. Lamborghini graduated from Fairhaven High School. David is with Procter & Gamble, Quincy. . . . **Steven M. McDonald** and Pamela J. Loftus on January 16, 1982 in Worcester. The bride is a student at Becker Junior College. Steve is with Data General in Westboro. . . . **Joseph P. Norman, III**, and Susan A. Bish in Springfield, MA, on December 27, 1981. The bride has an AS degree in medical assisting from Becker Junior College. Joe is a structural engineer at McDermott, Inc., New Orleans, LA. . . . **Scott A. Sargis** and Karen L. Richardson in Leominster, MA, on February 5, 1982. Mrs. Sargis graduated from Becker. Scott is a mechanical engineer with Chevron Chemical Corp. in New Orleans.

Anthony Cabral is a student at Carnegie-Mellon University, Pittsburgh, PA.

Cindy Canistro works as a project engineer at GE Plastics in Pittsfield, MA.

James Connor is a sales engineer for Advanced Micro Devices in Sunnyvale, CA.

Dan Doherty, Jr., works as a senior technical marketing specialist at Digital Equipment Corp., Marlboro, MA.

Ethan Foster holds the post of programmer/analyst at the Laboratory of Computer Science, Massachusetts General Hospital, Boston.

Currently, **James Geib** is a design engineer at Winchester Electronics. He is located in Watertown, CT.

Robert Hess has joined the Methods/Facilities Branch in the Production Department, Department of the Navy, Norfolk Naval Shipyard, Portsmouth, VA.

Peter Hinckley has been employed as a product engineer at The Torrington Company, Torrington, CT.

Keith Mazzarese works as a field engineer for Stone & Webster in Waterford, CT.

William Miller holds the post of sales engineer at Westinghouse Electric in Framingham, MA.

David Oriol is now an associate at Manufacturer's Business Systems, Inc., Worcester.

Frank Polito is part of the technical staff assigned to the digital lines department at Bell Laboratories, North Andover, MA.

Timothy Shea works as a scheduling engineer for Crawford & Russell, Inc., of Stamford, CT.

Jeffrey Smith is a planning and systems analyst-manager at Dresser Atlas in Houston, TX.

Peter Tiziani is a design engineer for Combustion Engineering in Windsor, CT.

David Valardi serves as a field engineer at Dresser Atlas in Rayne, LA.

Robert Wright holds the post of assistant engineer at New England Power Service Company in Worcester.

School of Industrial Management

Clifford Pontbriand, '58, continues as manager of frame operations at Pennsylvania Optical Co., Reading, PA. . . . **William Barlow, '65**, has been elected executive vice president at Wyman-Gordon in Worcester. He joined the company in 1943 and has worked in engineering, manufacturing and senior management jobs. . . . **Leo St. Denis, '65**, has been promoted to manager of quality control at Anderson Operations-Bay State Abrasives Division, Worcester. He has an associate's degree in mechanical engineering from Worcester Junior College. . . . **Ernest Anger, Jr., '78**, has been appointed manager of system development at Bay State Abrasives Division, Dresser Industries, Westboro, MA. He graduated from Wentworth Institute and joined Bay State in 1958 as an engineering technician.

Natural Science Program

In January Worcester State College physics professor **Robert Kelley, '60**, courtesy of the U.S. Navy, joined 36 college instructors from all over the country at Cape Canaveral to get a firsthand look at the "new nuclear Navy." One of the highlights of the visit was an opportunity to witness a simulated missile launch from a nuclear-powered submarine. . . . **Ralph Southwick, '66**, teaches science at Jefferson (MA) Middle School. . . . **Philip Wilson, '78**, continues teaching at Lynnfield High School, Lynnfield, MA. . . . **William Johnson, Jr., '81**, is a teacher at Rockport High School, Rockport, MA.

COMPLETED CAREERS

David E. Carpenter, '11, of Agawam, MA, a long-time employee of Westinghouse, died on April 1, 1982 at the age of 93.

Except for four years with Buckeye Products, Mr. Carpenter was with Westinghouse Electric Corp. from 1911 until his retirement. He earned the company's highest honor, the Silver "W" Order of Merit, and held a patent on a winding machine to automate the winding of motor stators and rotors. In 1955 he retired as a consulting manufacturing engineer.

A. Hugh Reid, '11, of Worcester, class vice president, passed away recently.

He was born on July 7, 1889 in Worcester. Graduated from WPI as a mechanical engineer, he was retired from CF&I Steel Corp. and belonged to the Tech Old Timers and Sigma Xi.

Alfred R. Kinney, '12, of Blacksburg, VA, a long-time employee of the U.S. Forest Service, died February 3, 1982. He was 92.

A Worcester native, he received a BSCE from WPI. During his career with the U.S. Forest Service, he served as examiner of surveys in West Virginia, Virginia and Pennsylvania and as chief land examiner in the Unaka and Pisgah National Forests situated in Virginia, Tennessee and North Carolina.

Roland H. Dufault, '14, of Wellesley Hills, MA, president of the Class of 1914, died on January 31, 1982.

"Mike" graduated with his BS in chemistry from WPI, then worked for three years at J. Russel Marble & Co., Worcester. During World War I he was a major in the U.S. Army. From 1919 until 1953 when he retired as branch manager in New York City, he was with du Pont.

He had been a member of the New York Board of Trade, the Chemists Club of New York, Tau Beta Pi and Sigma Xi. A native of Spencer, MA, he was 89. He was a former WPI Alumni Council representative from Philadelphia and a member of the Tech Old Timers.

William J. Becker, Jr., '15, of Kansas City, MO, passed away recently. He was 89.

During his career, he was employed by Butterworth Judson, Midwest Refining Co., General Engineering and Maintenance Corp. and Trojan Engineering Corp. From 1932 until he retired in 1957, he was with Long Island Lighting Co., where he rose to superintendent.

Mr. Becker, a Mason, was also a past president of his local Rotary Club. For 15 years he was active with the BSA, advancing to district director. He belonged to Theta Chi and was a World War I Army veteran.

Simon Collier, '16, a retired executive from Johns-Manville Corporation and resident of Los Angeles, passed away in December.

Following his graduation as a chemist from WPI, he joined the Boston Belting Company. Later employers were the National Bureau of Standards, Washington, DC, Johns-Manville, from which he retired as director of quality control in 1959, and UCLA, where he was an associate professor-lecturer. A nationally known authority in the field of industrial quality control, he specialized in quality control consulting in asbestos fiber and products. Papers on his specialty were published in various professional magazines.

Mr. Collier was born on June 1, 1894 in Salem, MA.

Edwin W. Bemis, '19, of Brick Town, NJ, died recently.

After graduating as an electrical engineer, he did part-time graduate work at WPI. From 1920 to 1962 he was on the headquarters staff at American Telephone & Telegraph Co. He joined ITT in 1962 and retired in 1968.

Mr. Bemis was born July 19, 1897 in Holyoke, MA. He was a senior member of IEEE and belonged to Tau Beta Pi and Sigma Xi. He served as secretary of the Class of 1919. He was a former secretary of the New York Chapter of the WPI Alumni Association.

Roy H. Carpenter, '19, of Wooster, OH, died on July 4, 1981.

He was born on September 11, 1897 in Warren, MA, and graduated with a BS in chemistry. In 1929 he received his MA from Columbia University.

After teaching in several high schools in Maryland, Massachusetts and Connecticut, he taught at Ossining (NY) High School from 1929 to 1945. From 1945 to 1964, when he retired, he was principal at Roosevelt School in Ossining. Mr. Carpenter belonged to the Masons and to the Ossining Board of Education.

Dana D. Goodwin, '19, of Fitchburg, MA, the retired president of W. C. Goodwin, Inc., died April 17, 1982.

A Fitchburg native, he was born on October 5, 1897 and later studied electrical engineering at WPI. During his career, he was affiliated with the Rock Island (IL) Arsenal and Simonds Mfg. Co. For many years he was the self-employed president of W. C. Goodwin, Inc., a retail shoe store in Fitchburg.

Mr. Goodwin belonged to Phi Sigma Kappa and the Masons. He was a former vice president of the Worcester County Alumni Club of the WPI Alumni Association.

Arthur W. Bassett, '20, of Lititz, PA, passed away on January 29, 1982.

In 1962 he retired as chief of power engineering at Armstrong World Industries, where he had been employed since 1929. Previously, he was with Pennsylvania Power and Light Co. and New Jersey Zinc Co.

He was born on January 4, 1897 in Heath, MA, and received a BSME from WPI. He belonged to the Masons, the Shrine, the National Association of Professional Engineers and Sigma Phi Epsilon. Formerly he served as president of the local chapter of the American Business Club.

David W. Dimmock, '22, died Christmas Day at his home in Hatchville, MA, following a long illness. He was 80.

Before retiring in 1959, he taught mathematics in the Falmouth school system for 15 years. For 40 years he operated a farm in Hatchville. He was born on February 21, 1901 in Pocasset, MA.

Austin J. Ball, '25, died March 9, 1982 in Hackettstown, NJ, at the age of 78.

A native of Clinton, MA, he was born on May 28, 1903. In 1925 he graduated as an electrical engineer from WPI. For many years he was employed by Consolidated Edison of New York City. He retired in 1975.

John J. McAuliffe, '25, of Walnut Creek, CA, passed away recently.

A native of Massachusetts, he was born on January 31, 1903. He graduated from WPI as an electrical engineer. For a number of years he was with General Electric in Schenectady, NY, and Westinghouse in Sunnyvale, CA. At his retirement he was an operations analyst at Stanford Research Institute in Menlo Park. He belonged to ATO and Skull.

Theodore D. Schoonmaker, '26, of Northboro, MA, a retired sales manager for Massachusetts Electric Co., died on February 16, 1982 in Marlboro Hospital. He was 79.

Following his graduation as an electrical engineer, he joined Malden Electric Co. From 1940 to 1944 he was an appraisal engineer for the North Central District of the New England Electric System. Later he was associated with the power sales department and then became commercial sales manager. He retired from Massachusetts Electric in 1967.

Mr. Schoonmaker was a member of the Masons, Trinity Church (former deacon) and the Tech Old Timers. He had served on the Municipal Code and Bylaw Committee of Northboro. He was the father of **Paul Schoonmaker, '56**, and was born on February 18, 1902 in Hyde Park, MA.

Albert A. Baron, '30, a retired manager for U.S. Envelope Co., died on March 16, 1982 at his home in Alhambra, CA.

He joined the Kellogg Division of U.S. Envelope in 1929 and was made plant manager in Springfield, MA, when the plant had over 1000 employees. He also was plant manager in Atlanta, GA, and Worcester and had been production control manager for the firm in Los Angeles, as well as western region sales representative.

Mr. Baron, a member of AEPi, was born March 10, 1907 in Bristol, RI. He received his

Besides serving on the WPI President's Advisory Council, Mr. Coghlin had held the post of president of the Worcester County Alumni Club, and was a former member of the Alumni Fund Board. He was chairman of the Class of 1923 50th Reunion Committees. In 1975 he received the Herbert F. Taylor Award for distinguished service to WPI. He was the father of **Edwin B. Coghlin, Jr., '56** and the late John P. Coghlin, a member of the Class of 1963.

For the past twenty years, Mr. Coghlin provided the J.P. Coghlin Manager's Award to recognize the outstanding student manager of athletic teams, an action which typified his concern for others and his generous heart.

Victor N. Colby, '31 passed away on November 27, 1981 in Hanover, NH, at the age of 73.

For 18 years he operated a poultry farm. He had also been employed by Jones Express, Sulloway Mills and Gile's Dairy. In 1976 he retired from T and S Vending in Franklin, NH.

Mr. Colby was born on June 24, 1908 in Franklin. In 1931 he received his BS in general science from WPI. He belonged to the Congregational Church and the Odd Fellows. He was past grand patriarch of the New Hampshire Grand Encampment and the current department commander of the New Hampshire Patriarchs Militant.

Thomas S. Johnson '39 of Framingham, MA, died in December.

He was born March 2, 1915 in Rockport, MA, and later became a member of the Class of 1939. For many years he was with Emhart Corp. (United Shoe Machinery), where he rose to administrative assistant in the Machinery Division, Boston. He was a member of Theta Chi.

Donald R. Bates, '40, a lifetime member of the President's Advisory Council at WPI, died in California on October 5, 1981.

A native of Norwich, CT, he was born on Dec. 16, 1917. He graduated as a civil engineer from WPI in 1940. During his career he served as a senior production engineer at Lockheed Aircraft, as vice president and partner of the Roll Forming Co., vice president of Daystrom, president of the Vista Furniture Co., president of Vista-Costa Mesa Furniture Co. (a division of Dictaphone Corp.), and president of Vista Travel, from which he was retired.

Mr. Bates belonged to Lambda Chi Alpha fraternity. He was active in fund raising for the WPI Alumni Association and had also been vice president of the Los Angeles chapter of the Alumni Association for many years.

Frank B. Stevenson, '40, a retired marine engineer, died unexpectedly in Lawrence (MA) General Hospital on December 1, 1981.

After graduating as a mechanical engineer from WPI, he worked for a short time for Vedeer-Root, Inc., Hartford, CT. He then served many years as a marine engineer at the Boston Navy Yard, retiring in 1973.

Mr. Stevenson was a member of Theta Chi and the Free Christian Church. He was born on July 1, 1915 in Lawrence, MA.

Melvin H. Knapp, '41 died in the University of Massachusetts Hospital, Worcester, on December 24, 1981 after a long illness.

For the last 20 years he was chief metallurgist at Reed Rolled Thread Die Co., Holden, MA. For 20 years prior to that, he was an experimental engineer and metallurgist for Brown & Sharpe Manufacturing Co., Providence, RI.

Mr. Knapp, who graduated with his BSME from WPI in 1941, belonged to Phi Gamma Delta and the Congregational Church. A member of the American Society for Metals, he had served as chairman of the Rhode Island Chapter before transferring to the Worcester Chapter. In 1976 he qualified as a life member of the Appalachian Mountain Club. He was chairman of the Worcester County Chapter.

Born on April 1, 1918 in Worcester, he was the brother of **Walter Knapp, '38**.

Paul M.A. Schonning, '50 died in St. Vincent Hospital, Worcester, on December 25, 1981 after being stricken at his home. He was 58.

With Norton Co. for seven years, he had previously been employed by Jamesbury Corp. and Wyman-Gordon, both of Worcester. He had served as a project engineer and senior engineer for Norton.

Mr. Schonning was born in Worcester on June 25, 1923. In 1950 he graduated as a mechanical engineer from WPI. He belonged to Lambda Chi Alpha, the American Legion, and the Masons, as well as the Aletheia Grotto, and the Society of Professional Engineers. For 40 years he was a member of the Quinsigamond United Methodist Church choir.

In World War II he served in England with the U.S. Army Signal Corps.

Charles H. Bidwell, Jr., '57 of East Hartford, CT, died as the result of an accident on July 17, 1981.

He was born on Nov. 29, 1934 in Hartford, CT, and received his BSCE in 1957. During his career he was with Jackson and Moreland, Inc., the Civil Engineer Corps of the U.S. Navy Reserve, and Burton & VanHouten Engineers. A member of ATO, he had also served as secretary, vice president and treasurer of the Hartford Chapter of the WPI Alumni Association.

He was the son of **Charles H. Bidwell, Sr.** of the Class of 1925.

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AMPERSAND

Visions of Youth

What awaits us 10, 25, 50 years into the future? For those of us who can find the time to ponder such things, the imaginings of children may appear incredible yet marvelous. But we who grew up with Buck Rogers or even the crew of Star Trek's fantastic Enterprise *might well recall our childhood ramblings and the extent to which many of them have become—with amazing speed and likeness—today's household terms.*

We feature here award-winning essays by Worcester-area children, grade 6 through age 16, on "Our Future World." A classroom project, the contest is sponsored by the Worcester Telegram.

So take heed, problem-solvers of the world, for it was not long ago—but for childhood fantasies—that "commonplace" events like space travel might remain inconceivable and heart transplants impossible.

Advanced Technology
By Carina Wong, 11

I think our future world will be basically the same as the present, though the technology may be a bit more advanced and there will probably be more use of it.

There are ideas for building domes over large cities and plans for a "super train" that can travel much faster because there will be no wheels to cause friction. This train will be moved by magnets. There is also a debate about the use of solar power for heating homes.

However easier or less work the future world may bring, I would still prefer nature and being outdoors in the fresh air over having a computer or robot do my work for me.

Machines
By Suzanne Lampson, grade 6

I think our future will be with machines. If we could get something we wanted by pushing buttons, that would be something everyone could do. We could have our household needs done for us.

I also think machines would be greatly appreciated by the elderly. If they could do more by machines they could get around easier.

We think we own machines, but we don't, they own us. If we didn't have any machines, what would we do? We would have no transportation and wouldn't have good meals. We just don't notice how much we have. Maybe in the future we will have new and better machines.

Robots
By Caron Engstrom, 11

I think the future world will be full of electronics, computer technology, robots and space cities.

The electronics will be nothing like our games today. That would be neat and fascinating.

The computers would be more advanced than you ever thought of. The robots would be wonderful. Some will only be two inches tall and will be able to pick up tables and chairs. Best of all they would have a little computer in them and could give you any answer you wanted.

The greatest thing would be the cities in space. They would be man-made and have all the human basic needs on them.

I would like to work on a computer or a robot. Maybe even live in a space city. I think it would be really neat.

Floating Cars
By Betsey Bentley, 11

In our future world we will have cars that will float on air. We'll just have to pump air in it to make it go. The houses will be so far up they'll be in space. The houses will all be condominiums. Instead of tar sidewalks and streets, we will have moving sidewalks and streets so we won't have to walk. We'll just stand there and if your car won't pump up, just use the moving street. Instead of staircases we would have escalators or elevators. And finally, everyone will be a millionaire.

Trips to the Moon
By Keith Higgins, 11

In the future world, the United States will be having people living on the moon. They will live in dome cities. It will be a lot like we live today. The cars would have thrust rockets and the speed would be 105 miles per hour.

The sports fields would be within the main dome, that has a gravity machine to hold everyone on the ground. The umpires and referees would be robots.

People would own space shuttles to fly wherever they want. Everyone would have their own robots. Children wouldn't have to go to school because they would have been born with great brains.

All this will happen in the future.

No Wars
By John Fitzgibbons, grade 8

I hope that in our future world there will be no clashes among our people and that there will be peace in the world to come. I hope the democracy in our new world will be equal for all people. I hope that people who are thirsty will be given something to drink, and those who are hungry will be given food to eat and those who are homeless will be given shelter.

No Inflation
By Reinaldo Torres, 11

I hope my future world does not have inflation and or other money problems. I hope laws will be fair. I also think our future world should have space colonies. Our future world should have cures for everything. I also think our future world is going to have peace.

COME ON BACK

WPI REUNION 1982

June 4-6

Special Events and Get-Togethers for the Five-Year Reunion Classes

1917

1922

1927

1932

1937

1942

1947

1952

1957

1962

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WPI Journal

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Engineering
Firesafe Buildings:
The WPI Approach

Reunion 1982

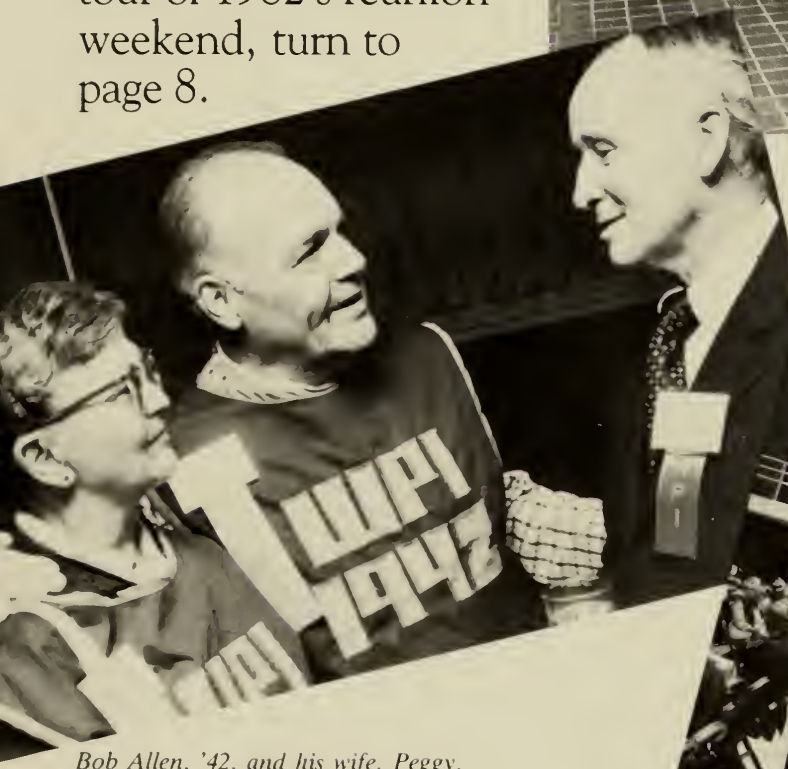
The CAD-CAM Connection

Reunion Sampler

For a photographic tour of 1982's reunion weekend, turn to page 8.

Francis Doyle

WPI's 25th Reunion Class of 1957



Bob Allen, '42, and his wife, Peggy, with President Edmund Cranch

At the annual Reunion Luncheon, Father Peter Scanlon gives the invocation.

Francis Doyle

The 60th Reunion Class of 1922

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

VOLUME 86 NO 1 AUGUST 1982

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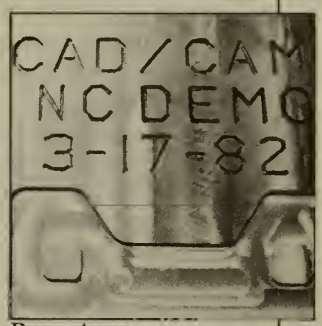

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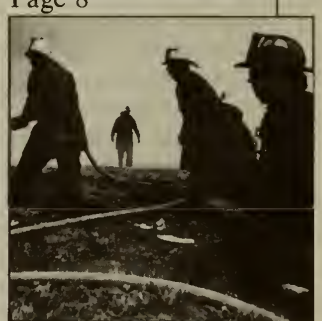
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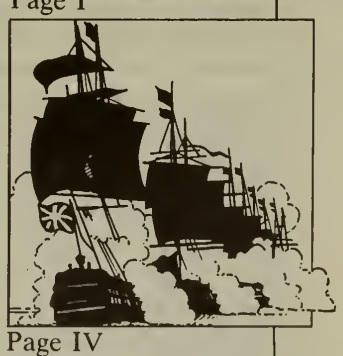
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On the cover: A five alarm Boston pier fire. Photo by Bill Noonan, Boston Fire Department.

NEWS FROM THE HILL

A Unique Approach to Alumni Communication

Remember your very first job after graduation? For most of us, embarking upon a career was an adventure filled with both great anticipation and more than a little apprehension: leaving friends, moving to a new city—perhaps across the country—beginning new professional and personal ties—a new life.

If the WPI Corporate Contacts program had been in place when many of us were coping with these changes, we would have found the adjustment less harrowing. Corporate Contacts, you ask—what's that?

In 1977, an alumni study group had the foresight to recognize that a graduate's relationship with WPI did not have to end on graduation day or reoccur only at reunion gatherings. At major corporations across the Northeast, WPI began a program where alumni could interact on a professional basis at their places of employment—a program that is still the only one of its kind in the country.

Clark Poland, '48, was enlisted to head the fledgling program, and new programs were initiated at a few corporations. Today, Mark C. Dupuis, '72, serves as national chair. "Corporate Contacts," he says, "is now in place at 16 corporations, and the programs are as varied as the alumni constituencies they serve."

For example, the program at Eastman Kodak in Rochester has proven to be exemplary. Since its founding, most of Kodak's 75 WPI graduates have gathered at frequent Corporate Contacts luncheons and other welcoming activities.

Closer to home, Riley Stoker Company and Norton Company both have developed successful alumni programs and have served as a major link between WPI and the alumni employed at these companies. At Norton, for example, widely popular informal get-togethers to discuss technical matters have been held on a regular basis. In addition, WPI faculty visit the company to inform alumni of recent happenings on campus. What's more, the involvement of both Stoker and Norton in sponsoring student projects has been extensive.

According to Ralph Mongeon, '55, who chairs Riley Stoker's Corporate Contacts program, "The beauty of this program is that it is structured so that there's no need to have a highly organized program, yet it offers such a natural affinity and convenience within the corporations that participation and involvement of alumni are very high."

Dupuis adds, "Improved communication is still a primary goal of the program, but one of the most positive results is one which was not anticipated by its founders: Today, many major universities are looking at the WPI Corporate Contacts as a model program, worthy of duplication at companies across the country."

WPI invites your inquiries on establishing a Corporate Contacts program at your company. For details, write Deborah Scott, Assistant Alumni Director, WPI.

KLM

The Winning Attitude of Bob Weiss

"A resurrector of doldrum football programs, a strong fundamentalist and a builder of men."

That's how well-known New England sportscaster Dave Connors describes WPI's Bob Weiss. Those who've witnessed the sustained success of WPI's head football coach could hardly disagree. For prior to bringing renewed life to the WPI gridiron, Weiss performed a string of miracles at the high-school level and served under some of the finest college coaches in New England. When he arrived on the scene at WPI in 1978, in the wake of the school's renewed commitment to football, Weiss's mission was simple enough: to produce a "respectable" football program. But considering WPI's record—the bleakest all-time winning percentage of any Division III team in New England—it seemed that this miracle worker had met his match.

Four years later Weiss has a new five-year contract under his belt, and the scoreboard tells the story. Following progressively improved seasons in 1978 and 1979, Weiss's 1980 Engineers compiled their first winning season in 12 years. And in 1981, but for six points, WPI would have finished the season undefeated. In the end, Weiss had to "settle" for a 6–2 season. At one point, WPI was ranked No. 1 and No. 5 in two prestigious football polls. There was even talk of an NCAA tournament bid, something no other Division III team in New England had ever been offered.

"Success is a matter of priorities."

A key to Weiss's success at WPI has been his tireless recruiting. "Bob is a very

effective, aggressive spokesman for WPI," says Roy Seaberg, '56, Director of Admissions. "He understands our many programs very well and is thorough in following through."

Weiss's reputation for ambitious football objectives and the Institute's commitment to exacting academic standards force him to compete on the recruiting circuit against schools with good football *and* academic reputations. Bob Bois, for example, a senior Bio-Med major from Salem, Massachusetts, who'll return in September as team captain, was courted by Harvard, Cornell and UMass, but came to WPI. "Coach Weiss was the difference," says Bois. "He sold me on all of WPI's merits."

Last year alone, Weiss's recruiting netted more than 400 football admissions applications. Though not all of these were what Weiss considers prime football prospects, each possessed qualities he felt could benefit the school.

Recruiting can be slow and tedious. But as Weiss sees things, "We're competing for student-athletes against some very prestigious schools, so we've got to be painstakingly persistent. Often we meet with the kids on several occasions at any combination of places—at their homes, their high schools or here at WPI."

But unlike some of the larger colleges, the personal contact doesn't end when the student enrolls and his WPI career begins for real. Weiss makes himself available to all his players and gets involved with every element of their college experience—from academics to athletics to personal problems. "I feel strongly about the total individual; that is, his progress toward graduation and his personal growth at WPI. And I'm proud of the fact that very few of my players get into hot water academically."

A 1958 graduate of Tufts University, Weiss was a standout halfback and baseball catcher. He also worked with two of New England's most respected football powers, Dartmouth College and the University of Connecticut, before taking the reins at WPI. Twice in his four years at UConn, the Huskies won the Yankee Conference championship.

Last January, Weiss was extended the opportunity to remain at WPI under terms of a five-year contract, an arrangement he prefers to the tenure system that existed for football coaches prior to his arrival. "Tenure is for teachers, not coaches," he says. "In football, wins and losses are what really count."

The 1982 Engineer football squad will be the first composed entirely of players that Weiss recruited personally. He'll have 17 returning starters from last season's 6–2 team, including seven All-New England performers. On paper, it looks like WPI should enjoy its third consecutive winning campaign. But Weiss, though confident, is the first to admit that sustained excellence in WPI football shouldn't be regarded as a given at this point.

"Certain ingredients make for a sound and consistent program," he contends. "We'll continue to push our sights higher to ensure WPI's football future."

Mark Mandel
Sports Information Director

Alumni Term Trustees Elected

Richard A. Davis, '53, S. Merrill Skeist, '40, and Leonard H. White, '41, were elected on May 29 by the WPI Board of Trustees as Alumni Term Trustees effective July 1, 1982.

This election continues the transition to an eight-year Alumni Trustee term. As incumbents, Davis and White will each serve a second five-year term, until June 30, 1987. Skeist's eight-year term will end June 30, 1990. None can be reelected when his present term expires. Skeist will fill the seat of Anson C. Fyler, '45, who has served as an Alumni Trustee for ten years and as Secretary of the Corporation since July 1, 1978.

Richard Davis is President of CCi, Inc., a computer sales and software firm in Waterford, Connecticut. He is active in community, church and business affairs, serving as Director of the United Way of Southeastern Connecticut, past Warden of St. John's Episcopal Church and past Director of the Greater Portland (Maine) Chamber of Commerce.

He serves on the WPI Alumni Fund Board, is a member of and chairs the President's Advisory Council and was Vice President of the Alumni Council from 1975 to 1976.

Merrill Skeist is President of Spellman High Voltage Electronics Corporation, Plainview, New York. He is a leader in religious affairs, serving on the Board of the United Jewish Appeal of Greater New York, on the Board and Planning Committee of the Long Island Jewish Hospital and on the Board of the Long Island Jewish "Y". He also chaired the Class of 1940 40th Reunion Gift Committee and is a member of WPI's President's Advisory Council.

Leonard White is President and Treasurer of R. H. White Construction Co., Inc., Worcester, President of the Milford (Mass.) Water Company and President of the Whitinsville (Mass.) Water Company. He is actively involved in the commercial, civic and religious life of the Worcester area, serving as Director of the Mechanics National Bank, Incorporator of the Worcester Hahnemann Hospital and Trustee and member of the Board of Managers of the Episcopal Diocese of Western Massachusetts.

At WPI he is a member and past Chair of the President's Advisory Council and Chair of WPI's Physical Facilities Committee.

Alumni Term Trustees account for 15 of the 33 seats on the WPI Board. Alumni, through the Alumni Council, have the opportunity to propose fellow alumni for Alumni Trustee nominations. Two channels facilitate such proposals. First, alumni clubs or other alumni groups may submit to the Council a valid proposal with the appropriate number of signatures. Second, the Trustee Search Committee of the Alumni Association can propose candidates. In either case, the Alumni Council then meets to act on the proposals and to make mominations to the WPI Board of Trustees, which votes to elect the Alumni Term Trustees.

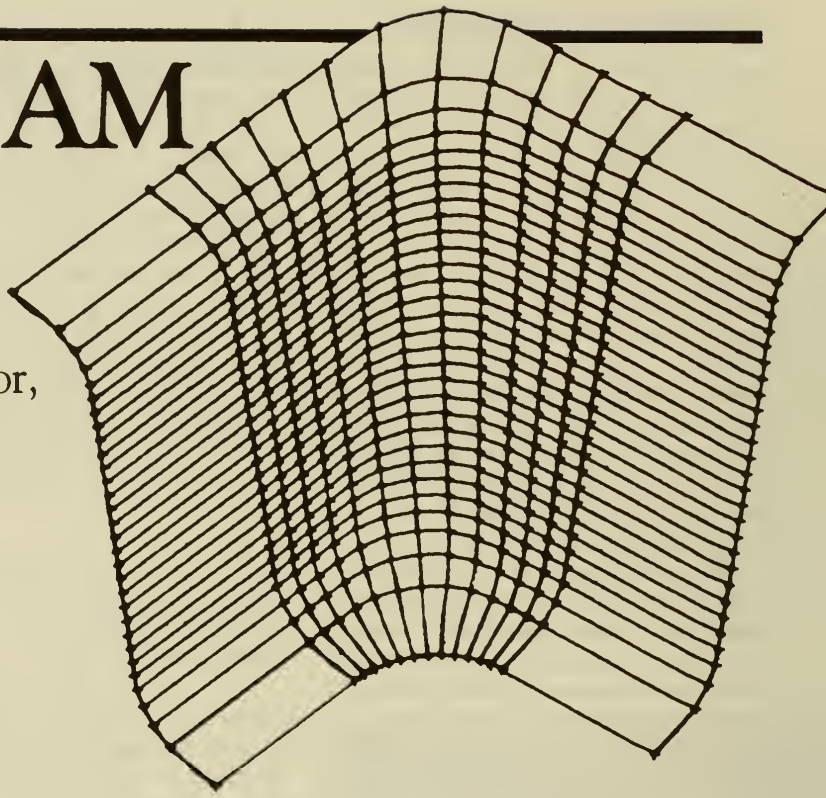
Congratulations are due Messrs. Davis, Skeist and White. KLM

Davis

Skeist

White

The CAD-CAM Connection



From drafting board to plant floor, computers are showing the way. Here's the WPI story on this remarkable field.

By Kenneth McDonnell

A current television commercial boasts: "If you had a favorite airliner, the all-new Boeing 767 will soon be taking its place. Coming in September." Wider, softer seats, more of them along aisles and windows, quieter ride, and improved performance are the anticipated benefits.

First time you settle into one of these flying armchairs, consider the technological advances required to lift, fly and land the 767 and the seemingly endless list of entrants into the race for airbus supremacy. The DC-10, for example, contains three miles of hydraulic tubing that bends, turns and cavorts throughout the airframe in triplicate—each a further measure of safety.

In the past, fabrication of such a system would have required literally man-*years* of slow, expensive handwork, constructing mock-ups of the plane's tubing with craftsmen bending and fitting each piece as they proceeded. Once fitted, the tubes were dismantled and stored to serve as templates for other pieces of tubing, many of these also bent by hand.

Today, computers handle much of this formerly painstaking work at a fraction of the cost and time. Designers can, using a graphic display terminal and fiber optic pen, conceive and draw the configuration of hydraulic tubing for the entire aircraft based on design, manufacturing and cost parameters held in the computer's memory banks. Instead of retrieving master tubes from a warehouse, the designer retrieves key structural elements from the computer's memory. Then, pressing a button, his design specifications are transmitted electronically to another computer, which controls tube bending machinery nearby. Finally—presto—out comes the tube, ready for assembly.

The most dramatic benefit of these new technologies—computer-aided design (CAD) and computer-aided manufacture (CAM)—has been that the tubes designed and fabricated under computer control fit into the airplane better, with fewer adjustments. Three years ago, as many as 100 tubes bent by hand for each McDonnell Douglas F-15 fighter didn't fit. Now, using CAD-CAM, an average of just four tubes per plane need readjustment. Where 12 craftsmen used to do the bending for each plane, now the job takes just three—a computer technician and two assemblers.

Says WPI's Professor Kenneth E. Scott, '48, ME, "The emerging capabilities of CAD-CAM place us at the threshold of an industrial revolution of uncharted proportions. At WPI, we're in a position with our newly acquired CAD lab to prepare our engineers and scientists for the tremendous opportunities the CAD-CAM industry offers."

Since its installation in August 1981, the WPI CAD Laboratory, with Ken Scott as its director, has provided hands-on teaching and research experiences in CAD for over 130 students and faculty. "Our goal," he says, "is not so much to train operators, but to integrate CAD into the WPI educational program so that graduates will be familiar with the technology and have the know-how to effectively manage those who do operate CAD-CAM systems."

While the more exotic CAD and robotics technologies and applications may share most of the limelight in the popular press and in technical circles, CAM continues to play a leading role in manufacturing technology, as it has for over 20 years. "Robotics," says Ben Gordon, '65, Associate Professor of ME and technical director of the Manufacturing Engineering Applications Center (MEAC), "is but one small part of CAM." Actually, he explains, CAM is the application of computer capabilities to manufacturing. There are still many common operations—assembly of intricate, high-volume parts, for instance—which today's industrial robots simply cannot handle very well. But in all cases, with or without robotics, CAD and CAM share a common *raison d'être*: to increase productivity, reduce lead times, improve accuracy and quality, and make design and manufacturing less costly.

At left: an example of a computer-created three-dimensional surface. It represents the corner of a pocket on a typical forging.

Many observers believe that truly integrated CAD-CAM systems, where the best of CAD and the most advanced of CAM are connected—both physically and through integrated computer programming—may provide America's best chance for competing successfully with the super-productive Japanese in the global industrial ball game.

"The U.S. is falling behind the Japanese in productivity," says Professor Arthur Gerstenfeld, "and only through the use of advanced automation can this trend be reversed." Gerstenfeld, Robert H. Stoddard Professor of Management, is particularly interested in robotics applications of CAM.[1] So far, say most experts, the U.S., not its Japanese counterparts, has made the most dramatic CAD-CAM breakthroughs. But with Japan's ability to *apply* new technologies, those who have pioneered CAD-CAM developments cannot afford to rest on their laurels for long.

"The rules of the game are changing constantly," Scott maintains, "and virtually with the speed of light. Our commitment is to give students at minimum a solid grounding in CAD-CAM, so they can respond effectively to change—however great."

The CAD of CAD-CAM is essentially drafting and designing with computer graphics displayed on a television screen. Anything that the designer can do with pencil, compass, and straightedge can be done mathematically with CAD. The big advantage, Scott says, is that the computer communicates with the designer through pictures. This enables the mind to absorb the information contained in the diagram much faster than it could through a conventional computer's format, numbers and words on the screen or on paper. "This," he adds, "and the ability to make changes at any stage in its development—this interactive capability—have been shown to improve design productivity by a factor of up to 5."

Unfortunately, he says, many industrial users don't tap CAD's full potential, remaining content to do simple drafting. Already, many systems are capable of conducting other operations, like determining mass properties, modeling finite elements, and simulating temperature and mechanical stresses. In the future, such capabilities will become common, enabling the computer's huge data banks to churn out lengthy calculations and detailed analytical results. This will add significantly to CAD's time and cost savings over conventional methods of design and manufacturing.

The real heart of every CAD system—and of all CAM operations for that matter—is *programming* of the computer that drives the graphics displays and analytical operations or, in CAM, the automated manufacturing machinery. It is not uncommon for legions of programming wizards to labor long on one program for one CAD system, writing and typing in the sometimes millions of commands required for each operation. All this, so that when the user pushes a keyboard button or uses a light pen on the system's graphic tablet, the thousands of lines and splines (curves) that form the graphic display can appear on screen.

Despite the substantial benefits attributable to CAD, say many observers, the real harvest will only be reaped by linking computer-aided design and manufacturing functions. CAD assists the design engineer to develop, design, analyze, and describe products. CAM helps the production engineer to plan the method of manufacture; to design tools, fixtures, testing rigs, and gauges; to prepare factory planning layouts; to keep track of inventory; and—perhaps most importantly—to drive computer numerical control (CNC) machine tools, measuring equipment and, ultimately, robotics.

The basic idea behind most CAM equipment has been with us for over two decades: to instruct machines to do tedious, repetitive manufacturing tasks—"the things humans are worst at," says Ben Gordon. NC milling machines, lathes, injection molders, and other equipment produce the same part over and over, re-

An industry in transition

CAD-CAM vendors may constitute the fastest growing industry around. In 1981 Merrill Lynch predicted overall industry sales of $750 million, soaring to $2.2 billion by 1984. Presently, some 5,000 CAD systems are in use worldwide. By 1985, that number should jump to 80,000, and new combatants for CAD-CAM's bonanza are sure to emerge in the battle for larger bites of this expanding pie.

Besides designing and drafting for manufacturing applications, CAD finds new applications in a host of other fields, such as integrated circuit design, plant design and documentation, wiring design, and mapping.

Presently, the utility mapping, cartographic and demographic portions make up only 3 percent of the CAD-CAM industry. But the expected annual growth rate of this segment is the largest.

Turnkey seems to be the catchword in CAD-CAM today. Turnkey refers to systems for which vendors provide the computer and the graphics display and peripheral devices needed for data storage and manipulations and "hard" (paper) copy output. Also supplied is the applicable software, or programming, which, when coupled with the graphics hardware, forms the interface between the user and the computer.

At Autofact III, a mind-boggling trade fair of turnkey CAD-CAM hard- and software held in November 1981, dozens of vendors brought the future of design and manufacturing to a Detroit convention hall. At this one show alone, Computervision Corporation, the industry leader, introduced 36 new products. The show's offerings ranged from the comparatively mundane to the exotic—from mechanical and VLSI design and numerical control tool path generation to architectural and structural design . . . from systems offering X-ray windows displaying the inside of a designed part, to color displays capable of generating over 1,000 combinations of hues and intensities . . . from systems with solid geometric modeling with color, to those capable of such analytic techniques as vibration tolerance tests on automobiles under simulated performance conditions.

All this and much more was new at Autofact III—and all in the name of productivity gains. Yes, it would appear that the U.S. is indeed serious about—depending on your viewpoint—regaining or honing its productivity edge.

[1]For the story of robotics at WPI, see "Getting a Gripper on the Future," coming in the February 1983 WPI *Journal*.

William Denison

In WPI's CAD lab, director Ken Scott works at a terminal. "This technology," he predicts, "will open whole new fields."

ceiving their marching orders automatically by reading and re-reading coded instructions from paper or metallic tape perforated with holes that translate into three-dimensional machine motion.

Formerly punched manually by expert machinists, these tapes are now coded directly from the computer, eliminating much of the error-prone and inefficient human factor. Today, a competent computer programmer is involved in the coding. But already this step is being eliminated. "Ultimately," says Gordon, "we'll generate an idea on the CAD screen, and *zing*, through intergrated CAD-CAM the output from that system will not be a punched tape, but the machined part itself."

"In the first five years of the CAM lab," says Gordon, "we've grown from ten students and one teacher—me—to 46 students, several master's degree candidates, and three instructors." Physically tying CAD to CAM is the logical objective of the WPI program. Presently, he says, CAD and CAM at WPI are essentially separate. The CAD lab is located in Higgins Labs, with the CAM and robotics lab situated in Washburn Shops. But when renovation of Washburn begins (planned for early 1983), CAM will move to Higgins Labs, bringing the two into close enough proximity to allow "hardwire" (electronic) connection. "With installation of the new CAD lab and the planned relocation of CAM," says Scott, "we have an opportunity to create a learning environment in which our CAD and CAM facilities are fully integrated."

"Actually," says Stephen Morgan, '82 ME, of Worcester, "the present physical layout of the labs led me to choose my Major Qualifying Project (MQP)." Assisted by Robert Neville, '82 ME, of Holyoke, he refined a system by which WPI's CAD and CAM labs can be more easily linked. "Before our Bridgeport three axis CNC milling machines can comprehend the computer signals of our Computervision Interactive Graphics System," he explains, "we must put the signals through a post-processing unit, which conditions the computer program signals to the needs of the Bridgeport."

Now, says Morgan, who has since gone to work for Pratt & Whitney, "by 'dumping' the post-processed signals onto the floppy disk of an Apple minicomputer and carrying it to a similar system wired to the CAM equipment, we've effectively eliminated the need for manual coding of the Bridgeport CNC system." Successful design and manufacture of a machined part, using WPI's CAD-CAM labs, was the product of his MQP.

"The designer could also hardwire the two computers and the post processor," says Gordon, but in either case the goal is to go from idea generation to machined part without having to use manual intervention.

Similarly, using integrated CAD-CAM, Bruce Olsen, '78, a CAM group robotics instructor, has programmed one of MEAC's robots to recreate (with pen on paper) the signature he wrote with the light pen on the system's graphic tablet.

WPI's CAD program has received the sustained support of both public and private groups. Start-up monies for the CAD lab were provided by the Bay State Skills Commission and the 25th Reunion gift of the Class of 1956. WPI funds have been used to prepare the 620-square-foot lab, including installation of climate control equipment.

But the heart of the lab—the computer itself, the terminals, the video screens, paper printer and program software—constitute the generous gift of Computervision Corporation of Burlington, Mass. The CAD lab is already providing graduates with the kind of hands-on knowledge employers actively seek.

Local support of student projects linking CAD and CAM has also been gratifying. Says Scott, "Our CAD program provides a natural interface between students' educational objectives and the needs of area companies interested in exploring applications of CAD-CAM to their own operations." Already, Wyman-Gordon Company, Jamesbury Corporation, Morgan Construction Company, and New England Electric have sponsored MQPs, with additional interest widening. Projects normally involve using the Computervision system to solve existing engineering design problems.

Working with Wyman-Gordon, for example, Stewart Farnham, Jr., '82 ME, of Spring Hill, Fla., is studying the use of CAD to expedite the manufacture of forgings.

According to Farnham, conventional die manufacture requires construction of wood and clay models, from which a fiberglass mold is made. Then, a tracer milling machine produces the actual forging die. Without CAD, the entire process can take months to complete. But by designing the geometry of the die on a CAD system, the die can be machined directly on a CNC milling machine, eliminating

the entire modeling procedure and cutting design and production time dramatically.

Comments Sanjay Shah, research project engineer at Wyman-Gordon, "The type of cooperative relationship we've established with WPI is highly beneficial to both education and industry."

Besides local project interest, plans are under way to offer a series of intensive mini-courses to practicing engineers, designers, drafters, and managers. Three to five days long, these workshops will comprise lectures, demonstrations, and, says Scott, "lots of laboratory exercises."

Where, one might ask, is CAD-CAM headed?

"At the rate things are going," says Ben Gordon philosophically, "one would be foolish to suggest that the computer's capabilities are either limited or boundless. We sometimes tend to forget that computers are no more than machines of and for their builders. But it's clear to me that we've only scratched the surface of computer technology in all its applications."

In design and manufacturing, he says, the ultimate is the factory of the future—the human-less manufacturing plant. Already the Japanese use robots to produce other robots, in a factory where automation has virtually eliminated the need for human labor; where castings (which are manufactured using integrated CAD-CAM methods) are stored in automated warehouses; where unmanned carriers transport these castings to CNC milling machines, from which they return by more unmanned carriers to yet another automated warehouse, there to await automated assembly and shipping.

One man runs the show.

People and Computers: Part 1

Paul Bresten looks like a union man. Then again, he looks like a management type. Truth is, he is—or has been—both at General Electric Company's Wilmington, Mass. plant. Bresten, '83 EE, of Lynn, systems operator and proctor of the WPI CAD lab, has seen both sides of the fence and has walked, little to his delight, the middle ground.

Prior to taking leave from GE to attend WPI in 1981, he was a unionized computer drafter. As a loyal member of the International Federation of Professional and Technical Engineers, he served first as recording secretary and then as chief steward for two plants. Then, while at WPI, Bresten was offered a summer post at the Wilmington plant supervising 12 CAD designers while also conducting a special GE project interfacing the CAD system with a computer-controlled circuit board tester.

Suddenly, he found himself facing his former colleagues, not as a union brother but as their supervisor. "In a few cases," he says, "I found *myself* the target of grievances!"

People problems surfaced, he recalls, when company officials determined that round-the-clock utilization was required to make the expensive CAD equipment cost-effective. Real fears surfaced among union drafters, who had ascended the seniority system using conventional, non-computerized drafting equipment and techniques. Suddenly these men, many of them middle-aged, faced a two-pronged threat—the need to modernize their work methods and the looming possibility of having to work the dreaded second or third shift, from which their long climb up the seniority ladder had, they presumed, exempted them.

Meanwhile, management, faced with the need to fill two additional shifts, hired draftsmen—many of them younger and more adaptable—who saw the need to learn new skills not as a threat but as an opportunity. As these new men grew more proficient, management felt pressure from both camps to award promotions based on either seniority or productivity.

Eventually, through the grievance procedure, many of the major personnel problems were ironed out. Today a conventional drafting system to update older, manually produced drawings exists side by side with the CAD operation, used to make new designs. The CAD operation runs both first and second shifts, while the manual drafting runs first shift only.

And, oh yes, Bresten plans to return to GE after graduation, this time as a product design engineer.

Part 2

The human element in CAM differs somewhat from CAD," says Ben Gordon. CAM operators normally tend to CNC tools, he says. And because the technology has been around longer than CAD, the labor force has had more time to adapt to the changing technology. Hence, replacing perforated paper tape with computers tends to be a much less harrowing experience than replacing pencil and straightedge with video screen and keyboard. "It's the automation, the ill-perceived notion that CAD operators must also be computer programmers—that scares the uninitiated."

Further developments in CAM, he believes, won't displace CNC operators, but many jobs will be upgraded to system-monitoring or sophisticated maintenance posts. Many workers will require additional training, almost always at the company's expense.

He adds: The initial cost of CAD-CAM systems—often in the millions—coupled with management's attention to short-run performance curves, creates tremendous pressure to make capital expenditures cost-effective within a relatively short time frame. "Despite these pressures," he says, "CAD-CAM promises the brightest future for many manufacturers."

Professor Ben Gordon demonstrates integrated CAD-CAM applications.

Welcome Back!

You'd think that the rain would have drenched our spirits as it did our slickers. But one look at the multitude assembled told otherwise. This was Reunion 1982, a wet but wonderful weekend when a near-record number of alumni families returned to the Hill to renew friendships, savor a touch of nostalgia—and stories that have grown with the years—catch up on the latest news about their alma mater, and simply enjoy themselves.

The celebration began with a bright sky overhead, but in no time the monsoons clamped down on all of New England, dumping eight inches of the wet stuff on Worcester in three days. So, with the out-of-doors effectively off-limits, hospitality suites quickly became focal points for sometimes years-awaited greetings of classmates, creating a place of real warmth in the eye of the storm. Throughout the weekend, emotions ran high:

Francis Doyle

The 40th Reunion Class of 1942

Francis Doyle

What else can you say? The weather wasn't the best, but for the Leo Toomajians and everyone else, the weekend was bright with good cheer.

Peter H. Horstmann, '55, president of the WPI Alumni Association

Francis Doyle

At the 70th Reunion of the Class of 1912 are (from left) J. Francis Granger, Henry Rickett and Eugene Powers—with Mrs. Ruth Taylor, whose late husband is remembered with the annual Herbert F. Taylor award for service to WPI.

Francis Doyle

A pictorial voyage through a wet but wonderful reunion weekend

• On Friday evening, when everyone enjoyed the timeless sounds of the Ragtime Rowdies, both at the annual New England clambake and at the Goat's Head Pub.

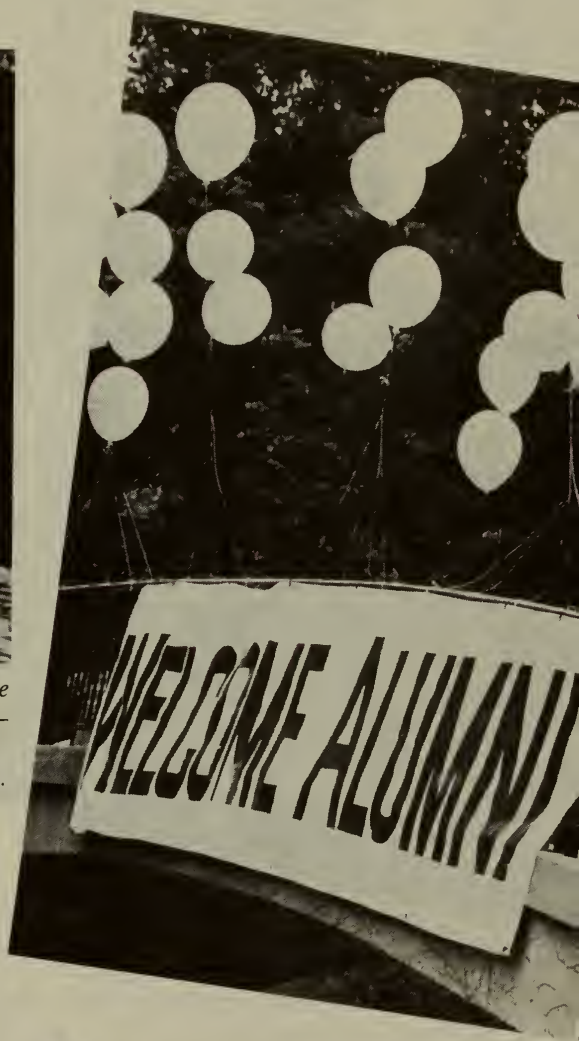
• On Saturday, when, between tours of the campus and a host of demonstrations and panel discussions, the General Reunion Luncheon was held in Harrington Auditorium. Highlights were presentations of two Goddard Awards for outstanding professional achievement, two Taylor Awards for service to WPI and the Alumni Association, and presentation of three major gifts to the college from the 25th, 40th and 50th reunion classes.

• And finally, at Sunday brunches, where pledges to keep in closer touch could be heard from all quarters.

This and much, much more the hearty will keep as memories of Reunion Weekend 1982.

The good times roll at the clambake as the Jack Hardings (left) and the Ed Supples—both '47—enjoy the music of the Ragtime Rowdies.

Bill Asp, '32, accepts for his class the Class of 1917 Reunion Attendance Cup from Alumni Director Stephen Hebert, '66.



Francis Doyle

e most jovial band of Worcester fire fighters ever assembled: the Class of 1937, with Fran Harvey at the wheel.

Len Huntoon, '62 (left), and Brian O'Connell, '62, with Pat Moran, '65 (center), General Reunion Chair.

Francis Doyle

WPI Trustee Raymond J. Forkey, '40 (left) and President Cranch (right) congratulate John M. Townsend, Jr., '42, and C. Chapin Cutler, '37—recipients of the Robert H. Goddard award for professional achievement.

The 50th Reunion Class of 1932

The Jack Herrs—he's Class of '22—stock up on WPI memorabilia at the bookstore.

With Professor Kenneth E. Scott, '48, on hand, G. Albert Anderson, '51 (left) and Julius A. Palley, '46, accept the Herbert F. Taylor Award for Distinguished Service to WPI from President Edmund Cranch.

Francis Doyle

PROJECTS

Models of Mystic Memories

John F. Salzig, '83, ME, and
Eric R. Schade, '83, ME
Prof. Herbert Beall, CM, and
Prof. James P. Hanlan,
Humanities, Advisors

In her heyday, Socony IV was one of hundreds of tugboats that plied the harbors of New York City. Built in 1912, she was special only because she typified the transfer tugs that have played a role in industry wholly inconsistent with their modest size. Next to the behemoths they so effectively push around, tugs are, after all, cute.

Mystic Seaport, perhaps Connecticut's finest monument to America's past, is the site of several models conceived and built by WPI students. If you've been lucky enough to visit the Mystic museum lately, you may have seen scale models of an old lift dock—a device that raised large sailing vessels above the water line for construction and repair—and a 19th century rope manufacturing plant. Both are working replicas, and both were constructed at WPI. And if you can manage a trip to this authentic village of yesteryear, you'll find on permanent display Mystic's first scale model of America's most beloved and storied watercraft—the tugboat. In this case, a model of Socony IV.

Constructed on a 1:46 scale at a "cost" of 300 to 400 working hours, the model is a labor of love and the IQP of two WPI seniors, John Salzig, of Leonia, New Jersey and Eric Schade, of Glastonbury, Connecticut.

To accomplish what turned into more of a venture than they had anticipated, Salzig and Schade relied on their individual talents and some captivating twists of fate. Salzig, an experienced wood-carver, fashioned the solid hull of laminated poplar from the blueprints supplied by Mystic; while Schade, who plans a career in models design, produced the cabin and deck from bent basswood, plexiglass and tooled brass.

But after extensive preparatory research on Socony IV, several unknowns remained. Where, for instance, is she stationed today? Notes Schade: "Though we still don't know, we were able to find an old tugman who worked her in the New York harbor decades ago and remembered much of her history."

What's more, in each of the five times she was sold, her color scheme changed to suit her new owner. So what would suit her modelers? "By sheer luck," recalls Salzig, "in talking with friends about my project, my dad met up with an old-timer who worked her when she was maroon and grey, with yellow trim—as it turns out, pretty appropriate for a couple of model builders from WPI."

Life Questions at NASA

Paul Maselbas, '83, CE
Prof. Herbert Yankee, Advisor

Quick! True or false: The fire suppressor Halon 1301 completely extinguishes all types of fires.

If you don't work around computers or other essential electronic equipment, you might not have the foggiest suggestion of an answer to this query. But don't feel alone. As WPI senior Paul Maselbas learned during his recent IQP, engineers and technicians at NASA's Kennedy Space Center (KSC), who work with some of the nation's most sophisticated and expensive electronics and who are protected by the agent, often don't know what you may not know: the capabilities and operation of Halon 1301.

Since 1973, NASA has used Halon 1301, a revolutionary fire extinguisher, in communications, computer and electronic data storage areas. To be sure, protection of ground-based electronics facilities demands the utmost in fire protection technology. For NASA, Halon 1301 meets the agency's exacting standards.

Though the mechanism by which Halon 1301 works is not yet completely understood, most fire protection experts believe the agent acts chemically with a fire, actually breaking the complex chain of hundreds of separate events which occur in the burning process. (Other, more common agents, like carbon dioxide or water, act physically by smothering or cooling the fire.) Upon discharge, the colorless, odorless gas completely floods the room, developing its effectiveness *very* rapidly.

The advantages of Halon 1301 over carbon dioxide or water are significant. Though much more expensive than either, Halon 1301 can penetrate areas inaccessible to these agents, such as cabinets or sub-floor spaces; electronic equipment can remain operational during discharge; and equipment cleanup is virtually eliminated.

When Maselbas made the trek down to Florida's KSC, his objectives numbered four: to research Halon 1301 and its use at KSC; to test, through a short questionnaire, the knowledge of NASA personnel about Halon 1301; to educate these employees, should their knowledge be found lacking, by means of an informative brochure; and, in the process, to get closer to the nation's space program than he ever dreamed possible.

In general, he learned that most of the 60 workers surveyed were quite uninformed about Halon 1301 systems—in fact nearly 20 percent weren't even aware that their areas were protected by Halon 1301. Clearly, Maselbas's resulting pamphlet, "Halon 1301 Fire Suppression Systems," was needed to supplement NASA's vital employee-training program.

As to Maselbas's fourth objective, to get really close to the space program, he recalls, "It was an unreal experience. I gained maximum civilian security clearance, got to see a space shuttle *Columbia* take-off up close, and actually climbed all over the shuttle soon after it returned from space." The NASA people, he says, are very receptive to the types of projects embodied in the IQP program.

And, if you're like the 52 percent of the survey respondents who said that, yes, Halon 1301 does completely extinguish all types of fires, you'd join this majority in being incorrect. The effectiveness of the agent on a Class A, or "deep-seated," fire is questionable, though research is now under way to solve this shortcoming.

Dougal Drysdale: Fire Man

by Kenneth McDonnell

This was not a delivery of scientific gospel according to a Nobel laureate. Nor an emeritus professor returned for a guest lecture. Nor even the final appearance of a retiring professor who'd won the respect of legions of students through decades of teaching.

Still, when Dr. Dougal Drysdale drew to a close the final lecture of his four-month stay at WPI, he removed his glasses, looked up at his graduate class in fire dynamics and simply said, "I guess that does it."

For a long moment his students made no move to query the professor, or even to leave the classroom. Silence. Then, one by one, chairs shuffled, students rose, and the applause that met Drysdale head-on fully captured the sentiment that the entire WPI community has come to own for this gentle, brilliant man from Scotland.

Drysdale, Lecturer (equivalent of our Assistant Professor) at the University of Edinburgh, is one of the world's literally handful of authorities on fire dynamics—the study of how materials ignite and burn, how heat is transferred in fires, how smoke moves in buildings, how fire grows from ignition to full-room involvement, and so on.

His mission at WPI? Professor David Lucht, Director of WPI's Center for Firesafety Studies, explains: "Through a generous grant from Connecticut General Corporation/Aetna Insurance Company, Dougal is here to write a textbook for graduate-level study in fire dynamics. In addition, he has now completed teaching WPI's first graduate course in this vital field."

Adds Professor Robert Fitzgerald, '53, who provided the spark for establishing the WPI Center, "WPI and Edinburgh have developed an ongoing partnership in offering master's degree programs in Firesafety Engineering. But until now, not one textbook has been written at a level that covers fire behavior principles in the form needed for engineering education."

According to Drysdale, in firesafety engineering it is essential not only to recognize fire risks, but also to assess their significance—to quantify, model and predict these risks. "Only then can buildings be designed, built and renovated to maximize firesafety in a cost-effective way."

Drysdale's interest in modeling combustion stems from his years of research. Having earned his baccalaureate degree at Edinburgh and his PhD at Cambridge and worked as a postdoctoral research fellow at the University of Toronto, Drysdale joined a leading-edge research group at England's University of Leeds in 1967. For seven years, he and his colleagues conducted exhaustive experiments to bring together the principles, data, and modeling techniques that would enable engineers and designers to better predict fire behavior.

He expands: "In the oxidation of a fuel—gasoline, for example—the end products are carbon dioxide and water. But between these two phases, hundreds of individual reactions occur, some fast, some slow, some which control the rates of other reactions." The Leeds group has been working to systematize all of these single-step reactions to make more reliable the combustion-modeling process. "So when we put it all in the computer and turn the handle, we can predict how the combustion we're trying to measure will behave."

In short order, this flying Scot has come to WPI and left his mark on firesafety engineering—worldwide.

The firesafety program at the University of Edinburgh, now well established, wasn't always so, says Drysdale. "In 1973, the University granted the program a ten-year trial run, so to speak. If the subject we proposed teaching proved to be academically worthwhile, we would become a permanent department in the University." Initially called Fire Engineering, the department soon renamed itself Firesafety Engineering. "Under the old name," he says wryly, "people outside the department couldn't decide whether we were there to start or to put out fires."

Drysdale says he's very favorably impressed with WPI. "The ideal," he notes, "is great, and it seems to be working," producing engineers and scientists who have been "stretched" in the appropriate areas, particularly through MQPs and IQPs. "As undergraduates they're doing work often associated with graduate-level studies, generating thesis-like documents over a long period of time, and passing a test of their competency in an entire field of study. This is a valuable experience, demonstrating to students the relevance to the outside world of what they're doing at WPI."

Dougal flew back to his beloved Scotland in May. But he leaves behind the manuscript for the first-ever textbook on fire dynamics, which, according to Bob Fitzgerald, will be welcomed for its literary quality as much as for its content.

But Dougal leaves behind much more. He leaves with all who came to know him—whether in the classroom, in our homes, in the WPI glee club or on the jogging circuits of Worcester—the distinct feeling that we are fortunate to have known him.

We'll remember his uncommon goodwill and sensitivity when we recall his farewell picnic at the home of WPI Assistant Admissions Director Doug ('67) and Carolyn Pike. Attired in his clan kilt, Dougal concocted the traditional Scottish delicacy, haggis—"You boil the devil out of a sheep's entrails, add oatmeal and herbs, and serve it with boiled turnips from the stomach sack of the sheep." (Yum!) Then, after serving it to the guests assembled, he proceeded to "strut his stuff" with this Scot's version of America's disco hustle.

Stephen Lasker

Mastering FIRE

In 1871, Mrs. O'Leary's cow set Chicago on fire. Today, people still die in fires—despite modern building methods. Why?

by Robert Kanigel

Fire. Thick, choking smoke billows up through a high-rise hotel in Chicago. "A classic, one-room mattress fire" touched off by a smoldering cigarette, says the local fire commissioner. It kills four people, injures 20.

In Baltimore, a candle tips over in a rowhouse where the gas and electricity had been shut off just the day before. The city's worst fire in 30 years claims 10 lives.

Three days later, across town, seven people are left dead in another rowhouse fire. Again, careless smoking. The children, all five of them, die of smoke inhalation. A next-door neighbor remembers, "You could just hear them screaming . . . right through the walls. It was really a hurting thing."

The U.S. has the highest per capita fire death rate among industrialized nations—quadruple, for example, that of Italy. Some 600 Americans a month die by fire. Thousands more are hurt, some of them being grossly disfigured or left in unrelenting pain. "You want to die," says a burn victim. "There is nothing that makes that kind of pain worthwhile." Flames consume billions of dollars worth of property each year. Billions more go to fire departments, or are spent on alarms and sprinklers, extinguishers and standpipes, to limit the toll.

But not all the billions are wisely spent. Well-meaning people meet in committee rooms to hear manufacturers, suppliers, contractors, unions, and civic groups lobby for particular points of view, then vote on safeguards—like insulation and sprinklers and fire doors—they think ought to be part of the building code. And sometimes they vote wrong.

Other people conduct tests, often at $25,000 a shot, to rate how well various building components stand up to heat, or how well particular materials promote or retard the spread of flames. But sometimes the tests designed for old materials don't work for new ones.

All in all, much time and money goes into reducing the toll taken by fire. Much of it is worthwhile; some is not. In any case, the problem could certainly be tackled more systematically. A more analytical approach might yield reduced costs, greater benefits. The age-old scourge of fires burning out of control and causing loss of property and of life—*You could hear them screaming . . . right through the walls*—could, in short, become an area of, well, serious study.

And that is what the people at the Center for Firesafety Studies at Worcester Polytechnic Institute in Massachusetts have in mind to do. They're trying to gather up the scattered mass of scientific research and folk knowledge, the gritty experience of generations of firefighters and the accumulated wisdom of the building codes, and make of it all a *discipline*.

David Lucht, director of the WPI firesafety center, has a model for how he'd like to see firesafety engineering make its mark in the world. His model is an allied discipline that's already respected, professionally "mature." His model is the specialty known as structural engineering.

"Go ahead, open up a building code," urges Assistant Director Jonathan Barnett. He's referring to the bulky volume in which each town or city sets forth its special requirements for new construction. Typically, the code will be three or four inches thick, with fire safety provisions occupying most of it. Rules governing structural design may take up barely a finger's width.

Plainly, it's no less life-threatening for a building to collapse than to be consumed by fire. It's just that when it comes to how thick a structural column should be, Barnett observes, the building codes trust the engineer: *We won't tell you how to do it*, they say. *Just assure us it will be safe, affix your signature and your seal as a professional engineer to that effect, and that's good enough.*

Back at the turn of the century, before structural engineering came into its own, Barnett goes on, this wasn't the case at all. Then codes dictated every structural detail. The code-writers would hear that a 6-inch concrete slab had collapsed? Well, they would demand 12-inch slabs—no matter that careful analysis might reveal eight inches to be enough.

Though well-intended, it was a cumbersome way of doing things, and one ultimately discarded as structural engineering's predictive powers grew more respected. Yet fire safety for buildings today, lament Barnett and Lucht and others at the WPI firesafety center, is mostly handled in the same, too-rigid way. *Apply so many inches of insulation* to a column, says the code. Or, *Space the seats in the auditorium just so widely*. Or, *Make the wall sheathing material just so thick*. The code becomes a mass of detail, piled up over the years, varying immensely from community to community, the product of innumerable local battles lost and won. "It's design by committee," says David Lucht.

The codes, of course, came about for

a reason. In 1871, Mrs. O'Leary's cow kicked over a lantern and Chicago burned, the fire taking 250 lives and obliterating three-and-a-half square miles of the city. The next year, Boston burned. After a succession of big, costly fires around the turn of the century, the insurance companies were, as David Lucht says, "going broke. . . . The way those cities were built, they had all the ingredients for tremendous conflagrations." Periodically, they got them.

So beginning in 1905 came the first of the underwriter-inspired "model codes." Wood construction was out, firewalls in. And the fact is, Lucht points out, "We don't have Chicago burning down anymore."

But people are still dying in building fires, in brick, concrete, steel, and glass structures no less than in wood ones. How come? For one thing, as Dougal Drysdale, a visiting professor from Scotland, points out, "It's not the building that burns, it's the contents." Carpet and drapes and furniture and paper *do* burn, and architects exert no control over them.

Another factor is the heavier use of plastics. As Lucht recently told viewers of the *Nova* television documentary "Why America Burns," the new plastics have "caused problems that the fire codes haven't caught up with yet." Plastics-fueled fires burn faster, with more smoke, and churn out prodigious quantities of poison gases like phosgene, chlorine, and cyanide. Of course, adds Lucht, "the carbon monoxide kills you in any case."

To make matters worse, standard tests developed on older building materials like cotton, wood, and wool often fail to reveal the dangers of the synthetics. In one demonstration aired for the *Nova* documentary, for example, a plastic rated high by one such test—the "Steiner tunnel test," originally developed to rate the fire potential of wood panels—was consumed by flames within a minute and a half. A low-rated plywood, on the other hand, would have taken 20 minutes to become similarly engulfed. This kind of thing, says Jonathan Barnett, is a classic example of a test being used "poorly, blindly."

Still another problem ignored by the old code-restricted approach to fire safety is the change in building construction since World War II. Modern materials make for lighter, cheaper construction—but for poorer fire containment, too. And while architects often do specify fire-resistant flooring materials, for example, builders sometimes poke holes in them for air conditioning and other building-wide systems, without going back to plug them up.

All in all, declares Jonathan Barnett, "We're spending millions a year for fire safety we don't need"—leaving millions a year unavailable for fire safety we *do* need.

Fire Facts:

One in three fire deaths and injuries can be ascribed to careless smoking, one in four to arson (which has gone up 400 per cent in the last ten years). Eliminating just these two causes of fire, together with installing smoke alarms in every home, would cut fire losses in half. (Jonathan Barnett remembers once leaving an electrical wire near the pilot light, after cleaning his stove. "It was about an hour before it heated up enough to melt the insulation," he recalls. A fire did start, but his smoke detector alerted him to it. "The smoke detector saved my life," he says, "and the fire extinguisher made it easy to put out the fire.")

How tall should buildings be from the standpoint of fire safety? "As tall as you like," says Jonathan Barnett—given intelligent design. The two usual approaches to high-rise fire safety are sprinklers or compartmentalization. Intelligent design involves a judicious mixture of both.

There is no shortage of research" on how fires start, catch, and spread, says David Lucht. "You could fill this building with papers about fire." The National Bureau of Standards has a Center for Fire Research, and key work has been done in Japan, Germany, and Sweden. But the material is scattered. The problem is getting at it, making sense of it, applying it. As a matter of fact, declares Lucht, there is "not a single hardcover text on fire behavior, anywhere."

That lack is precisely what Dougal Drysdale has been trying to overcome, and why the University of Edinburgh professor has been at WPI for the past months. Working under a grant from a New England insurance company, the sandy-haired, woolly-looking Scot, whose temporary office in the basement of WPI's Higgins Lab was graced with bicycle and loaded backpack, has been putting together the first comprehensive text on fire dynamics. Not surprisingly, he's awash in the chemistry, physics, and mathematics of fire that he's been trying to distill into the book. "Fire is really a feedback process between the flame and the surface" of the burning material, he says. It represents "quite a delicate heat balance."

Heat balance. It's not just how hot something gets that determines whether it will sustain a flame; it's whether the burning generates enough heat to offset that carried away by heat transfer processes like conduction and radiation. (Water extinguishes a fire, notes Drysdale, by absorbing its heat.) You are apt to have trouble igniting a log with just a match—however hotly it may burn—because a match simply doesn't supply enough heat to make up for that conducted away by the log's considerable mass. You need kindling, burning furiously, to get your fire going.

A haystack, on the other hand, can burst into flames spontaneously, with no external source of heat at all. In a slightly moist haystack, Drysdale explains, bacteria find an ideal setting for growth. And as they multiply, they generate heat—not much, but the mass of the haystack itself serves for insulation, and the temperature slowly climbs. Finally, the hay may start to smolder—and, upon finding enough oxygen to support combustion, to burn.

Assistant director of the firesafety cen-

ter Jonathan Barnett has been using computer modeling to study the structural burdens fire imposes on buildings: When a steel structural member gets up to about 1100 degrees Fahrenheit, it weakens markedly, losing its structural integrity. Or this, as Barnett says, has been the rule of thumb behind code provisions specifying how much insulation structural members must have, the idea being to ensure they never reach the forbidden temperature.

But this is just the kind of rigid formulation Barnett wants to see replaced with a "rational engineering approach to design similar to that used in all the other engineering disciplines." Such an approach, he says, can pay substantial dividends. Swedish researchers who pioneered the techniques he hopes to refine have found that through them they routinely "save 10 per cent on the cost of fire protection for a building."

The fact is, steel does not simply turn to jelly upon reaching 1100 degrees Fahrenheit. For one thing, it responds differently depending on whether it's heated quickly or slowly. Moreover, fire not only weakens it, but may apply additional loads. For example, a column not free to expand is squeezed by heating. And a beam subject to one-sided heating may bend out of shape. But perhaps such loads are small compared to others the building faces and may thus be safely ignored? No, says Barnett. "You don't know beforehand which are negligible." So all must be factored into the computer model.

Because fire is inherently so complex, the analogy to structural engineering, he admits, is not a perfect one. Still, "We have all the tools we need to design for structural fire loading," he says. "Now we just have to put it all together." With the computer, he believes, the problem will ultimately be rendered "manageable." Calibrated on test data already available, Barnett's computer model may help make such costly tests of structural assemblies unnecessary.

Barnett feels strongly that "every significant building should have a firesafety engineer on its staff," just as now it will have a structural engineer, an architect, a mechanical engineer, and so on. "I envision a day when we won't have building codes, when we'll start to trust the fire engineer's seal, just like the structural engineer's," he says. Specifically trained to handled firesafety problems that today get short shrift, and no longer hamstrung by unduly restrictive codes, this new species of engineer will likely come up with innovative, cost-saving solutions.

Barnett tells of a high-rise hotel in Boston that has an atrium broken up into intimate seating areas separated by handsome concrete planters. A renowned interior designer at work? No, it seems the design was heavily influenced by the building's firesafety engineer. Since sprinklers wouldn't work at that location, he decided to limit the fuel available to feed a potential fire. Dispersed furniture and concrete planters were the aesthetically pleasing result.

Fire Facts:

In most modern buildings, it's not the structure that burns, but the contents. One rule of thumb among firesafety engineers is to figure on ten pounds of wood or wood equivalent per square foot of floor space. That's six tons of fuel in even a small, 1200-square-foot house.

Why does the U.S. have the highest fire losses of any industrialized nation? "Because people don't care," says Barnett. In Japan, "if you have a fire in your home, people say 'What's the matter with you?' Here, they commiserate with you," and immediately inquire into the status of your fire insurance.

The *Nova* TV documentary "Why America Burns" pointed out that in Switzerland, chimney sweeps clean each chimney and inspect every home twice a year. A satisfactory fire inspection is a prerequisite for fire insurance.

Three quarters of those who die in fire die of smoke inhalation, and are never touched by flame.

Robert Fitzgerald, who helped found the WPI Center, calls firesafety engineering "a primitive field just emerging into the twentieth century."

The Center conducts research, a masters program—the only one in the country—and what Fitzgerald calls "technology translation." That broad heading will ultimately include short courses and video programs intended to reach everyone from fire commissioners to architects, and a steady stream of textbooks (Drysdale's being the first) on aspects of firesafety.

One day, Fitzgerald believes, the field will progress to the point where it is seldom viewed, as it typically is today, as a luxury. It's simply not true, he declares, that "good fire protection always costs more money." In fact, he says, "instead of restricting the architect it opens him up," making possible imaginative solutions like the hotel atrium to which Barnett referred.

Future buildings will be "fine tuned," he says, to fight fire. The city-wide and building-wide focus will be obsolete: buildings will be designed so a fire simply can't get going. Even the arsonist, in this safest of all possible worlds, will be foiled in his task. "We want to design so that even if somebody intentionally starts a fire, the building," Fitzgerald says, "responds appropriately."

Fire.

A source of almost universal satisfaction as flames flicker in the fireplace, safely contained. But a source of terror when they're not, of excruciating pain among fire's survivors, of nightmares. And of revulsion, too, at the sight of those disfigured by fire—like the beautiful child scarred beyond recognition whose before-and-after pictures in a 1973 federal report I forced myself to view every time I needed to remind myself what this article was really all about.

Fire must be tamed.

THE RISE AND F

Power shifts uneasily in the world. Little wars break out like brush fires, not always for obvious reasons. Brash young empires assert themselves, leaving older ones caught off balance. Can any sense be made of it all?

We asked a panel of historians, political scientists, and economists, from Alumni Magazine Consortium schools and elsewhere, to try. You may eavesdrop on their discussion.

Art by Allen Carroll

For a reading list on empires, write the Alumni Magazine Consortium, 209 Whitehead Hall, Johns Hopkins University, Baltimore, MD 21218.

Bryant Cureton, political scientist, Hartwick College, moderator of the discussion: I will start with an utterly simple definition: An empire is a supernational political system created and governed more or less centrally by one of its parts; it is held together either by the exercise of power or by the threat of power. That is extremely simplistic, and I offer it primarily for you to enlarge, attack, or whatever.

Let me suggest that we begin by just going around the table, from a roughly chronological perspective. Paul?

Paul Rahe, classicist, Franklin and Marshall College: All right. I'd like to read briefly from the Melian Dialogue. At one point in Book V of Thucydides, the Athenians respond to the Melians:

> So far as the favor of the gods is concerned, we think we have as much right to that as you have. Our aims and our actions are perfectly consistent with the beliefs men hold about the gods, and with the principles which govern their own conduct. Our opinion of the gods and our knowledge of men leads us to conclude that it is a general and necessary law of nature to rule wherever one can . . . we know that you or anybody else with the same power as ours would be acting in precisely the same way. . .

The view that's expressed is that it's a general and necessary law of nature to rule wherever one can. If that's the case, then our choice is not between empire and no empire; it's between holding an empire and being part of someone else's empire. The secondary choice might be between a decent empire and an indecent empire.

Paul Thibault, medieval historian, Franklin and Marshall College: In the medieval framework, the basic question was not the fact of rule, which was taken for granted, but the *purpose* of rule, which was viewed from two perspectives. The earlier idea was that we have governments to rule us as punishment, as a direct result of the fall from grace, of expulsion from the Garden of Eden. Later, particularly after the 12th century, the view pointed out by Thucydides was revived: that is, that you find rule everywhere. And because God created a good world, rule must therefore be good.

The question still remains—what is good, what is the purpose? The purpose is salvation. All government, in this view, must ultimately lead its subjects to salvation. In the medieval mind, however, the overarching framework is not any specific political unit, such as the Holy Roman Empire, but Christendom in general, which is the perfect society.

Michael Vlahos, diplomatic history and military strategy, School of Advanced International Studies, Johns Hopkins University: I'd like to discuss the way Americans responded to images of empire, images which by their very nature define

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our deeper identity as a state, or a people, or a race.

In that framework, there are two senses of empire. The first grew out of the central legitimizing concept of authority, and there we use the word imperium—which has nothing to do with a geographic place. The second emerged from a mythology that developed about the Classical empires. An empire became a concept of universality, something through which an entire ekomene, or known world, was unified.

The first concept—that of authority—implied for early Americans the mantle of ritual kingship. And the United States originated in *reaction* to that concept, as a kind of counter-empire. In the second American image, we see ourselves as a virtuous republic in a new world.

So in two senses America grew as an anti-model. It is seen as a virtuous republican alternative to the degenerate monarchies of Europe, and in another sense it is a complete, separate sphere or orbis, a removed democratic ekomene, a leader of sister republics.

Now, the path of America toward this second concept evolved only after the second world war. By 1950, we had accepted this mantle of universal leadership, as if we were elected by the other free states of the world to fuse the two worlds, our own and the old world. But we never have been able to accept the mantle of kingship. If you look at America today, our fear is not one of global involvement, but rather the fear of internal corruption that seems to come with kingship. We do not wish to *rule*.

Louis Wolf Goodman, economist, American University: I've focused my research for the past 15 years on transnational corporations, which some people like to talk of as types of empires. These complex organizations do have a few things in common: There is some centralized authority in transnational corporations and in the various geographically based empires. There is some kind of social structural differentiation. And there is some process of incorporation of new units. Beyond those characteristics, my enthusiasm about similarities diminishes.

So far, we've been talking about one important question, mainly, what ideology justifies the existence of these so-called empires? Certainly transnational corporations have a fully developed ideology about global efficiency in use of resources. It's a highly debatable one—efficient for whom, *et cetera*—but there is an ideology there, just as there were ideologies that justified the existence of previous complex organizations.

Romesh Diwan, economist, Rensselaer Polytechnic Institute: There is only one purpose for empire: to enrich the imperial country at the expense of the colonies. And the similarities among empires, both in the past and the present, lie in the transfer of resources and maintenance of privilege. Even today, the existing international order is perceived to encourage the transfer of resources from the South to the North. In that sense the present international order has similarities with an empire; no doubt there are also differences.

There are built-in contradictions in the process of empire-building. One, the cost of the necessary military force keeps going up, so the question of guns versus butter cannot be avoided for long. The U.S. today is in this situation.

Two, the imperial country must enforce a particular ideology, based on two propositions: A, everything associated with the imperial country is good and desirable, and B, everything associated with the colonies is bad and undesirable. Everything involves virtually everything: religion, food, dress, habits, customs, manners, *et cetera*. Thus the religion of the imperial country is sensible and reasonable, while that of the colonies is superstitious and illogical. For such an ideology to seep in, the imperial country must enforce it to the point that it becomes part of the language. But the ideology of superiority, being a contrived one, cannot remain operative, because it diminishes both the colonizer and the colonized. Inevitably people realize that.

Three, the imperial economic arrangement distorts production because it subsidizes certain sectors, thereby making the system inefficient. For example, the U.S. developed a whole production structure based on cheap energy. Now a major part of the production structure is becoming unviable.

In view of these inherent contradictions, empires wither away, slowly but surely, and I am not convinced that they must keep recurring. Through the process of human development, all empires will eventually wither away. The movement of nuclear disarmament, and the call for a new international economic order, may be interpreted as progress toward this withering away. These elements are leading us to a new, humanistic, and equitable world order, in which empire will remain an incident in the history of human development.

Robert Kargon, historian of science, Johns Hopkins University: I agree with Romesh that the essence of the imperial situation is group advantage through some kind of domination or control. And since I'm an historian of science, I'd like to call attention to the fact that science and technology have played an important role as a means of domination.

The rulers of empire usually have other rationales for governance, usually the good of the ruled. For centuries, as

To ignore nationalism is to ignore the fact that when empires go, you get the Dark Ages.

Paul Thibault pointed out, Christianity was the central rationale for empire—salvation of the pagans or barbarians or whatever. They would be saved at the cost of their lives and their families. But in the late 18th and early 19th centuries, increasingly there was talk about bringing good government to sort of anarchic parts of the world—particularly among the British, who prided themselves on a talent for government. And the rulers of empire also claimed they were bringing advanced technical civilization to those benighted parts of the world who had not had them. That is, empire was still rationalized as for the good of the ruled, but now the uncivilized would become civilized as we understood it, which meant modern medicine, public health measures, improved means of communication, train travel, and so on.

Technology served two functions. It helped the rulers enforce physical domination. The way the British used very small numbers of soldiers to rule India, for example, was absolutely a brilliant use of technology, in that respect. But the application of modern technology also gives a psychological domination. There is a French film called *Black and White in Color* that was put out a couple of years ago, about German and French squabbles in 19th-century Africa, and it has a brilliant scene where French missionaries are trying to convert Africans to Christianity. What they do is bring out a bicycle, and they ask the Africans to ride this bicycle. They all try, and they all fall down. Then the missionaries bring out an African who has been converted to Christianity. He gets on the bicycle and rides around. So the unbaptized heathens flock to be baptized. It is the power of technology.

Michael Vlahos: The way you're talking, any state that oppresses its own people or some other people is an empire, or any state that has any kind of influence beyond its own borders is an empire—well, that's ridiculous. Then *every* state becomes an empire and the word becomes useless. We should try to decide what empire means. Is empire authority, or is it space? If it's space, what kind of space?

Louis Goodman: I personally would prefer to be in a discussion in which we settle for some kind of hazy definition, then go on to address important human issues like the ones Romesh brought up. I'd like to discuss whether empires are withering away or not.

Paul Rahe: What if the alternative to empire were war? The Greeks would have said so. In one of Pericles's speeches he says to the Athenians, "Your empire, your arche, your rule, is tyranny. It may have been wrong to take it up; it is not safe to lay it down."

Nationalism is a primary force, and to ignore nationalism is to ignore the fact that when empires go, what you get is the Dark Ages.

Vlahos: I agree. The overriding reality today is that we're involved in a major struggle between the same forces that some of you seem to think are withering, namely conflicting ideologies that are embodied in large imperial-like or quasi-imperial structures. The tension of that confrontation is the overriding reality of life today, not some hazy and hopeful schema.

Goodman: I really disagree. The conflict may appear in the press in terms of conflict between ideologies, but I think the conflict has to do with distribution of goods and services.

Vlahos: This is the fundamental issue. I think culture overrides economics.

Rahe: That would be the question of nationalism versus economics as well.

Romesh Diwan: When you talk of nationalism—what in the last analysis is nationalism? Many times it's nothing more than the commercial interests of some groups who have been ruling.

Rahe: The Iranian revolution, which is a rather important event, cannot be explained in terms of economic domination. But it can be explained as a nationalist uprising. In particular, it is a defense of a way of life that's based on religion—and definitely threatened by modernization in general. Especially modernization that comes in a Western guise.

Diwan: But it's not independent of economics, either. You look at the depth of the revolution and who supported it, and it got its basic impetus because the economic deprivation of the masses was so large.

Vlahos: I'm sure that helped, but it doesn't explain the nature of the revolution, which is a profound cultural rejection.

Robert Kargon: The form the revolution takes certainly has tremendous cultural overtones, but I don't see how you can separate the economics from culture.

Vlahos: You don't, you don't. I think they flow together, in the same way that you talk about technology replacing Christianity. It didn't. Technology was an expression in very palpable form of the values and larger behaviors of the West.

Rahe: I'm wondering about the medieval empires—how they would fit into all this.

Paul Thibault: Let me take the very simplest example, the Holy Roman Empire. It's essentially a Germanic institution, not by nature expansive—with certain reservations, for it will expand towards the east, and in a colonizing way. But it primarily reflects domination, a cultural view that anything brought by a Christian is better than what it finds outside its frontiers. They are convinced that they are the perfect society, and it is part of their mission to bring perfection to other people.

The Crusades and the establishment of the Latin kingdom of Jerusalem, I think, were very much an imperial expansion. Jerusalem was an outpost of a few colonists who dominated another culture, while remaining segregated from it.

We could argue the same for Israel today, that it is a similar expression of Western superiority, that Israel is a Western outpost in an alien land dominating a large region with a relatively small number of Western colonists.

Kargon: What's the mother country?

Thibault: Europe, or the West in general—

Kargon: That's bizarre.

Bryant Cureton: In general, how essential is crusading to the idea of empire?

Rahe: Utterly absent before Christianity, I think. When the Romans think of their empire, *in time* they begin to think about the benefits of peace, the Pax Romana. But there is no crusading concern at all. Their concern is solely with security, and in fact, in the early Roman empire, there is *no* extraction of resources. All the Romans ask from their subject allies is troops in times of need. They tax only their own citizens; they do not tax their allies. In time, when they begin to absorb areas outside Italy, they impose a tax, but usually almost all the money is used to support the army that protects this area against invasion.

Goodman: If we accept your assertion, I can think of two hypotheses why extending good to others only became more important later. One idea might be that in the time of the Greeks, the world was so chaotic that people didn't have time to think of justifying things. They just had to get security, and that's all they worried about. Another hypothesis might be, given mass communications, that today the dominated are much more aware of what's going on. Given that greater intensity of knowledge, it gets dangerous not to pay attention to what the people you're dominating think of you, so you try to do them good.

Rahe: Perhaps, but I would argue that the coming of Christianity marks a watershed in human history. What Christianity does is establish itself as a catholic or a universal religion. It goes beyond Judaism, which had taken the line that the chosen people were to be a light unto the nations and therefore had a universal role, but which didn't seek to proselytize. The effect is that, if you're a Christian, the most important thing in your life is salvation, and if you have a friend, the most important thing you can do for him is save his soul. That leads to the crusading instinct.

Goodman: All right, what about non-Western empires? Do you get the same—

Rahe: No. The Persian Empire, for example, did not impose its religion, and it practiced great respect for the local customs, laws, and habits, as well as religions, of the people. Its religion was a kind of unifying factor only among the Persian ruling class. They did enforce some token public expressions of respect for the imperial ruler, but fundamentally, the crusading instinct is absent.

Goodman: As we're talking about it, it seems that the Christian world view leads to a much more totalitarian imposition of a way of doing things.

Vlahos: What about Islamic empires?

Diwan: In Iran—there had been no Islam there. There had been an earlier religion that was completely wiped out, and Iran is purely a Moslem country now. Not only that, Islam even destroyed whatever culture Iran had, whatever language they had. Everything was destroyed.

Rahe: I take it back. Maybe monotheism is the watershed, because Islam behaves in a fashion similar to Christianity.

Goodman: That's a fascinating hypothesis, that it's *monotheism* that projects an absolutist view of things, which translates itself into a cultural totalitarianism.

Vlahos: I think this is a positive aspect of imperialism, because once you do enter in and impose a kind of homogeneity, you can develop on the basis of the new ethos. In other words, the cultural imperialism embodied in Christianity—and its development in the form of modern technology and mod-

ern Western ideology—does create a common ground. Once the entire set of values is accepted by everyone, then you can begin to develop on that basis, and I think this is positive.

Kargon: You say that once Christian values permeate a society, then some kind of homogenization of this empire will take place. Isn't that what you said? I want to comment on that, because when the Spaniards converted the Indians in the New World, no Indians were permitted to become rulers.

Vlahos: No, only now are you beginning to find Indians in Mexico in high positions in government, and not that many. But what I'm saying is that ultimately the way to eliminate empire is to create cultural homogeneity. That allows people to avoid insoluble conflicts, and I think that's one problem today. We still have conflicting worlds, and the world view that's embodied by the Soviet empire is a major factor preventing the post-imperial phase we all so long for.

Thibault: Would you describe the Soviet system as an empire?

Vlahos: Yes. I think the U.S.S.R. is very Byzantine in the way it handles its legitimacy. The emperor was proclaimed the representative of the people, and you can follow that strand through the czars. Today, the true word is interpreted through the head of the Soviet party.

Thibault: I think that's important, the true word. The link to a world view which is seen as intrinsically correct and therefore merits imposition on others.

Kargon: When it gets down to it, I believe there is a Soviet empire because the Soviet army enforces Soviet policy.

Thibault: Simply like that? The ideology doesn't matter?

Kargon: Simply like that.

Diwan: What you are saying is that the force is there, and people are not really persuaded by Marxism. I accept that. I think Marxism is a rationalization rather than an ideology.

Rahe: Nevertheless, it gives the U.S.S.R. an enormous power in the rest of the world, in the sense that they have an ideological following in virtually every country that is vital to them.

Diwan: That occurs where people see their current system as oppressive, and the only alternate system is a Marxist one. It's an escape route.

Kargon: Many regimes which are really military cliques call themselves Marxist, and we have to be careful of relating that description to an ideology.

Cureton: I'd like to go beyond this question. Do we see anything approaching a world view sufficient to support a new world order?

Rahe: My view is that we're going to have a new world *dis*order; that we have been very fortunate since the second world war in that the U.S. has had a rather loose hegemony, not quite an empire, throughout much of the world. As American power declines, what you will see is the reassertion of traditional regional hostilities. To put it in a nutshell, I think that if the Argentines had not landed on what the British call the Falkland Islands, and what the Argentines call the Malvinas Islands, Argentina would have gone against Chile.

Goodman: I think you're absolutely right that there has been since World War II a sort of Pax Americana. But I hope you're wrong about the new world disorder. What if we have a different kind of world order, with consultation among allies? My favorite remark from President John Kennedy—to whom I don't give a lot of credit in other areas—was that the purpose of the United States is to make the world safe for diversity. That is, to make the world a place where we don't need a common culture to get past empire, where we can respect each other's diversity, and work out international problems in a more imaginative way than imposing our will.

Diwan: I think we certainly will muddle through towards a better order. We'll muddle because we have serious conflicts, no doubt of that. The reason I believe we will muddle *through* is that we have developed over the past two or three hundred years in a way you can describe as Christian. If you go to India, if you go to Mexico, you can find Christians, even though there won't be any one culture that one would consider Christian. So a certain humanism is developing.

Also, we have put in place in the international system some institutions, like the U.N., in which we can talk together. Talks may not solve the Falklands problem, it's not an easy problem, but one can take a hopeful view. So, regional conflicts can reasonably be resolved because a forum exists.

Vlahos: Right. For small conflicts of interest.

Elise Hancock, editor of the Alumni Magazine Consortium: But what about BIG conflicts of interest?

Diwan: In big conflicts, I accept that maybe the best we can

Through the process of human development, all empires will eventually wither away. We are entering a new world order.

do is maintain a stalemate. But if the U.S. government decides it is not going to accept compromises, my feeling is the U.S. population is recognizing that they are not prepared to fight—and so are the Russians, so are the Russians. They have suffered 20 million deaths in war. People who have seen their parents die, their sisters die, don't fight easily. There is in the whole world today a feeling that we have to solve the problems. There is a sense of equality.

Vlahos: In 1914, in Europe, the trendy analysis was that there could be no war because financial markets would collapse in a few weeks. A society that had strong cultural bonds, that had the Hague, that had international courts to settle problems, that had reached conventions about limiting certain methods of war, and—

Thibault:—had cultural unity—

Vlahos:—They tore each other apart. I don't think we can discount that happening again.

Goodman: Well, no one's saying there's a zero possibility. There are different kinds of probabilities. I make the assertion that if we keep our balance of power in the world by one nation imposing it, that lessens the probability that we're going to move on to a better system.

Vlahos: It also lessens the probability of war. In other words, you had more stability in the early post-war period because you had two superpowers who were able to really police their own areas. And now that has broken down. You have much more fragmentation.

Rahe: Except that there is one empire that's growing. As the American empire, or the rather loose hegemony we've exercised, begins to fall apart, there's one empire that's expanding. It's an empire that does not exercise a loose hegemony. I'm thinking of Soviet troops in Afghanistan. I'm thinking of the use of East Germans and Cubans in Ethiopia.

Kargon: The question is whether in the long run the Russians will encounter the same problems that the British and Americans have. I think they will. Ultimately. It may take them more time than we'd like.

Goodman: It's debatable whether the Russian empire is expanding or contracting. You could go from country to country around the world and tot up more Russian losses than Russian gains. I think that this casting the world in a bipolar confrontation, Russia and the United States—

Rahe: I didn't do that. I wouldn't think in bipolar terms if for no other reason than the existence of China, and because Europe in some sense, I'm not sure in what sense, is emerging as a pole of its own.

Goodman: Right. I apologize. But the point is, I don't think that even the Russian empire is expanding today.

Diwan: If you look at the relationship between Cuba and Russia, I don't think there is an imperial relationship. I think that Cuba is a cost to the U.S.S.R.

Rahe: Arguably the 19th-century British Empire cost Britain, and certainly I do not believe that the United States gained economically from its colonial holdings in places like the Philippines—in comparison with the cost of those holdings.

Kargon: Quite true, but *some* people in the United States made money. *Some* people in Britain—

Rahe:—Some people always make money in war—

Kargon:—and those some people had a lot to say about policy. What I see happening now is that foreign policies do not exist in the Western states. What we have is trade policies.

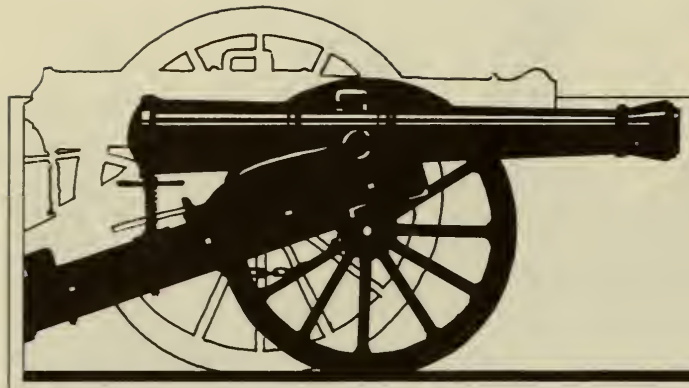
Cureton: Louis, do you see transnational corporations as an independent force that supports an optimistic view?

Goodman: Well, I think that transnational corporations are forces that serve their own purposes, and to the extent that they reinforce global interdependence, they diminish the possibility of global war. That's because war is not in the interests of those corporations.

But to think that those forces are more powerful than nationalism or other forces in the world, sovereign forces, is an illusion. Taken in themselves, corporations can be a force for peace. They can also, on other levels, create increased inequality. And viewed on a global scale, I think they cause income concentration rather than distribution. But they have also promoted a transnational set of interests.

Vlahos: What's your prescription, then? For a better world, I mean.

Goodman: I think the most important thing would be for the most powerful nation in that world to deal with world problems in a broadly consultative process whenever possible, rather than trying to impose solutions all by itself.



Perhaps it's no longer possible for the U.S. to avoid the true imperial mantle.

Vlahos: Rule by committee has its own drawbacks.

Elise Hancock: What about minding our own business?

Rahe: One problem with minding our own business is that since 1960 our involvement in international trade, and our dependence on resources outside our own continent, has become so great that we no longer have much choice about minding our own business. That is, minding our own business means minding other people's business.

Kargon: I disagree. I have an optimistic scenario which goes along what you might call the Japanese model. They mind their own business.

Rahe: Japan can mind its own business because we do the security for them—essentially. It strikes me that one effect of the decline of American power will be a breakdown in trade relations, because of the equivalent of piracy. In other words, the Japanese prosper and are able to mind their own business only because they're a protectorate.

Goodman: What's your analogy to pirates today?

Rahe: One analogy might be what Khaddafi has been trying to do in the Mediterranean.

Vlahos: That's the traditional pirate—there's also the greater pirates in terms of cartels and groups of nations that seek to impose their needs on others.

Diwan: On the other hand, consider transnational corporations. These are the only groups which can *afford* to be pirates today, and it would be in their interests to maintain order in the seas. So do you think they will allow any piracy? They have their own armies.

Goodman: I think the problem lies in the regional areas, regional ekomenes that are growing in the world. You're going to have regional powers, and they're going to become empires—Brazil, India, Iran—and that's going to cause conflict—

Rahe: Yes, and that's why we'll have a breakdown in trade. If there were a war between Argentina and Chile, that war would be raging over an area that is in fact a choke-point for world trade.

Vlahos: How about the Congo, too? Strategic minerals could be cut off.

Diwan: You're forgetting the history. Immediately when there's a war between two small powers, you said it yourself, the U.N. *exists* to stop them. It's only when the war takes place between the U.S. and the U.S.S.R. that the U.N. becomes useless.

Vlahos: I think the Pax Americana still obtains, and Saudi Arabia is a nice illustration. The U.S. has to maintain not only our own interests in the Gulf, but those of Japan and the Western alliance. Alone—in spite of all the consultations we've made asking Europe and Japan to help us out. And they're the ones who are so dependent on Middle Eastern oil. Now, were America to find itself in a position where we were no longer reliant on that petroleum, we might see fit not to extend our security enforcement to that area. That could create a very sticky situation.

Goodman: But we would still stay in the area, even if we didn't need that oil, because we're also dependent on Europe and Japan to be healthy economies to buy our goods.

Kargon: I think the case of the Shah of Iran demonstrates that there are tremendous limits on what we're able to do to guarantee the security of a region.

Vlahos: I'm wondering whether we might be in transition to a world like before 1914, with power fragmented. Then who's going to stop the Soviets if they want to extend their influence into Iran?

Diwan: We have baited ourselves with the idea that the U.S.S.R. is really a bully, that they're just out to do us in. But the reason we are losing our empire is because of its own internal stresses, and when the U.S.S.R. steps into that worldwide dimension, they will have *their* internal problems, which will denigrate their capacity to be the pirates of the future world.

Vlahos: Or inflame the situation, that's the point. The stresses in the Soviet Union and the conflicts there may create such powerful pressure that the Soviets will respond with the only implement they know how to use, and that's their military.

Goodman: That's scary.

Diwan: In this scenario there is one possibility and that is the end of the world.

Rahe: That's the Pax Atomica.

Vlahos: Pax or Pox?

Rahe: Ambiguous. The point is, if it weren't for the existence of atomic weapons after the second world war, we would have had a third world war long ago.

Vlahos: Absolutely. Absolutely.

Rahe: The question then is, what is the prerequisite for continued restraint? One of the things that has helped restraint is that atomic weapons have been in very few hands, which is to say very few people have had to exercise restraint. As those weapons spread—and they will spread—we will be in a situation where a good many *more* nations have to exercise restraint. I think there are very few grounds for optimism.

Diwan: I think we in America have a certain feeling that we are somehow superior. We have this atom bomb. We are responsible. They have the atom bomb. They are irresponsible. I don't accept that argument. We are responsible because we recognize the atom's power, as I think *every* nation does.

Goodman: There's another kind of global disaster which could have been inflicted on the world throughout the whole century, by almost any nation, and that's chemical or bacteriological warfare. We certainly do read in the newspapers about the uses that the Soviet Union is alleged to have made of that particular weapon, but nevertheless no catastrophe has occurred. So that's grounds for optimism.

Thibault: Given the circumstances, how would you go about building an empire today? *Can* you build an empire? I mean, a good, old-fashioned empire on the late 19th-century British model. Can it be done?

Kargon: Everything has a cost, and even the British Empire may have cost more to maintain than it brought in—but the costs were perceived as worth it. The question is, in the 20th century, does anybody conceive the costs as worth it? Obviously, the Soviet Union does, in terms of security, especially in areas that are physically contiguous to it. They conceive of Afghanistan as worth it. But if they have problems in Angola, or problems in Cuba, are they going to continue to see it as worthwhile? That's problematic.

Vlahos: I think if we had a real disruption in one region a successor empire could form. I can't see African colonial demarcations remaining forever, for example. Why can't you have a new Caliphate, too, with the upsurge of Islamic fervor? I'm sure Khaddafi dreams of that already. He may not be the one to realize the dream, but I could see that kind of thing happening soon. The U.S. is receding from that area, while Islamic power and wealth are growing.

Diwan: Power is growing, but what have the Mideastern countries to have power over? If you take their money away, what have they? Nothing.

Vlahos: But we're not talking about taking their money away. The trade continues.

Rahe: He's right, though. They lack industrial infrastructure.

Goodman: Furthermore, a charismatic leader has not emerged. Khaddafi, you know, is hated—

Hancock: You think a charismatic leader is essential?

Goodman: A charismatic leader is important for setting something up—then you need to institutionalize it to keep going.

Rahe: A charismatic leader always begins with one nation. He gains leadership over one nation, which then develops some kind of military superiority that allows them to establish an overall hegemony. Now, the reason I suspect an empire will not happen in the Islamic world is that I cannot think of a candidate for military superiority. You have to be able to build your own weapons, that's the first priority.

Vlahos: That's why it won't be Libya, for example. But let's draw another illustration. I think that India will be the one to dominate the Indian Ocean. Already, with its relation to Bangladesh and some of the Himalayan princedoms, it's a regional system. I think that India is *already* an empire, and I think India is a perfect example of the empire we'll see in the future.

Goodman: We're getting back to a point that Michael raised in the beginning. When is it useful to pull out our definition of empire? Do we want to say that these different spheres of influence are empires? Is it useful to use the same term as we would to talk about the Holy Roman Empire, the Greek empires, or whatever? I don't think that it is, myself. These past empires as we conceive them aren't going to happen again, but there will be other forms of rule. The British Empire might not go on, but we do have transnational corporations, and we have other forms of complex international organizations that exercise power worldwide.

Vlahos: But that's influence. Influence is different from legiti-

mate authority. Our stereotype empire is the loose British one, and I agree we're not going to see that. What we're going to see are the *true* empires of the past based on authority, not rooted to nationality, and having a direct and legitimized administration over those different peoples.

Kargon: Legitimized by military power.

Rahe: He's put his finger on something, though. The Soviet empire's foundation in legitimacy is radically different from the Persian Empire's foundation. It's not the divinity of Brezhnev that is the ideological foundation—it's a certain vision of the future.

Thibault: Which is an absolute vision—

Rahe: —and is universal rather than national in character.

Goodman: And *that's* what's spreading in the world! That type of vision! That's the thing you see in Vietnam, you see it in Iran.

Thibault: Can I throw something in, just to see if it clicks? Is nationalism the antithesis of empire?

Goodman: I think it would be either a prelude to empire, or a reversion from it.

Thibault: So, as long as nationalism is a strong force you can't *have* empires in the classic sense.

Rahe: We never did agree on a definition of empire, but I think we may agree that there are stages of empire, in the sense that the ancient empires seemed to lack the universal religious claim of the medieval empires. If one moves to a third stage, progress becomes the justification for empire. The question then is whether, since World War II, we have entered a fourth stage.

I'm not sure we would reach agreement on the character of the fourth stage. Is there room for empire within the fourth stage? Is there room for loose hegemony in the fourth stage—by which I mean the existence of client-states. Or is our future one in which empires no longer exist? Or there might be a future not unlike that envisaged by George Orwell, in which you have a number of regional empires emerging and in conflict, and likely to remain in conflict.

Kargon: I see this period as a period of the passing of empire as we have known it. And despite the capacity of people to inflict great suffering on other people, I think the passing of empire is still a good thing. I think there will still be areas of hegemony, spheres of influence. But I think we'll see much more evidence of the limitations of power.

Cureton: Doesn't that suggest the decline in power of both ends of the spectrum, both empire and nationalism? You've talked about national entities being less able to control their destinies because other nations get in the way more.

Rahe: I think radical nationalism today requires socialism: which is to say you must nationalize the economy, or else be penetrated by the economic structures of outside powers.

Thibault: But do you think it will be successful, or is it simply a flailing of one's arms in front of an onrushing train?

Rahe: The Soviets have done it very successfully, I think. The Nazis did it rather successfully.

Goodman: I think we have to distinguish between recently and years ago, because the costs of cutting yourself off grow greater and greater. The Soviet Union may have done it successfully in 1917, but to the extent that they're autarchic today, it's costing them.

Diwan: I think nationalism has two phases. First, a phase when nationalism also becomes a struggle against empire. Nationalism becomes a vehicle to throw your yoke away.

But once you have achieved some form of national independence, then nationalism is not such a strong force. As I see it, more and more countries have become nationalistic in recent years simply because they were leaving colonial status. Once they become independent, by and large, they are joining other countries. Interdependence has become much more important.

Goodman: There were changes on the other end, too. If you look at the behavior of transnational corporations today, compared with 1970, they're adapting much more efficiently to local situations, putting up much less rigid conditions.

Thibault: I think Romesh's point is very well taken, because nationalism is not an historical constant. It's a product of particular circumstances, and I wouldn't be surprised to find *our* form of nationalism simply evolving into a union, or a similarity of outlook, among English-speaking peoples.

In the Falklands, for instance, I would posit that one thing tilting us in favor of the British was language. Because with that strong link of language, we also have similarity in political institutions.

If you look at America,
we fear — not global involvement — but rather
the corruption that seems to come with kingship.
We do not wish to rule.

Goodman: If instead of England and Argentina, those two powers were France and India, I bet we'd side with France.

Thibault: Now wait a second, I think you're muddying the waters. Let's use France and Argentina.

Goodman: No, India's political language is English, and I want the developing nation speaking English.

Hancock: I think he's right. We would feel a greater commonality with France than with India, which we perceive as exotic.

Goodman: You see, it's the developed versus the developing, North/South. That is a more important dimension than English/non-English speaking.

Rahe: How about cuisine?

Goodman: Not to say that English isn't important—and North/South is a variable in itself.

Vlahos: No, wait, wait. I think you have a point. The point I want to add, though, is that there's a smaller system that America could retreat to, that in my monograph I call Anglo-Oceania. Which is exactly the language bond. It's got 12 million square miles of land, and it takes in Australia, Britain, the U.S., Canada, and New Zealand. They could create a quintilateral nuclear force, even a formal federation, which could possibly survive in a chaotic world. I think that what we're seeing in the Falklands is the very beginning of that kind of cultural fallback.

Thibault: Look at what France is doing with *its* former empire. To whom are those Saharan nations looking nowadays? Right back to France. That's certainly what the British Commonwealth hopes for, but I don't think it's working very well.

Rahe: One thing that's worth throwing in on this nationalism issue: None of us at this table is really a citizen of an ordinary nation. The United States is a *very* peculiar place because it draws people from many nations, and to the extent that the so-called melting pot works, it denationalizes people.

Kargon: We seem never to have developed the notion of an American by blood.

Thibault: An American by bluejeans!

Kargon: By being here, we become Americans. A guy steps off a boat—he's already an American. This is unique in, I think it's unique in the world.

Cureton: Does any of this suggest that the United States has—if you'll forgive me—any kind of special mission as a midwife in the emergence. . .

Vlahos: I think that we *used* to, in a very low-key way. We always felt a sense of mission to be a model for other nations, and we opened our doors to others. And I think as a model for what society should be we still have great faith in ourselves, that this is the best place to be, that our model is best. We offer this to anyone to take or reject, and they take.

Rahe: Some do.

Goodman: I think we're being very ethnocentric. For one thing, the United States did have a hell of a proselytizing period, building outposts like Alaska and Hawaii and the Philippines.

Vlahos: No, no, no, no, no. America has always seen itself as a sanctuary and a refuge. But it took us a long time before we got ourselves sorted out, and a longer time before we thought we'd offer it to the rest of the world. Only through the trauma of World War II, when our very existence was threatened, were we finally brought face to face with the fact that rather than having Britain as a buffer, we had to take upon ourselves this mantle of leadership. We did it only for a short period of time.

Goodman: That's the ideology. There's a Uruguayan philosopher named Rodó whose most famous advice is to Domingo Faustino Sarmiento, the Argentine president. He said, "To govern is to populate."

Vlahos: Trade didn't follow the flag in the U.S. The flag followed the molecular movement of individuals across—

Goodman: That's the point. To govern is to populate.

Rahe: Yes, but we're not colonizing now. We are not exporting Americans to take over places like Hawaii.

Goodman: People would argue that we don't have to do that anymore, that transnational corporations, or whatever other institutions developed, do that work much more efficiently.

Kargon: In what way are these transnational corporations American? They're not.

Rahe: They're *culturally* American.

Vlahos: —agents of our culture—

Goodman: Not exactly. I would argue that we have a new kind of thing going on in the world, not necessarily because America is unique—which it is—but because these complex corporations have evolved. They bring a new kind of ideology, I would say, a somewhat adulterated form of loyalties—

Vlahos: I agree with you in one sense, that the elite members of a lot of Old World countries have entered the United States and are developing a transnational sense. The momentum of the world, though, is with the traditional types, people who heart and soul are identified with indigenous groupings.

Hancock: Would you all say the world is groping for different ways of satisfying—I mean, what did an empire do? It gave you stability, it gave you something to believe in, it gave you military and economic protection—

Goodman: That depends on what side of the fence you're talking about. It gives you something to fear, something to be oppressed by, something to lose money to, and it strips you of your sense of self-worth. If you're not part of the group, you're no one. You're untermensch.

Diwan: She's right, though. The world is groping towards some sort of a—I wouldn't use the word empire—some way of solving interdependence problems which become very complex, and I think some sense of the world government is there already. The problem of the world unit today is that it lacks two basic elements. One, it has no taxing or interfunding capacity. The second is, it doesn't have any power.

Vlahos: Right.

Diwan: Think of the Law of the Sea, which has just been passed—except the U.S. is no longer a participant. If this organization comes into being, it will provide international income capacity, which is quite a step forward. Maybe the next president will go along with it because the Carter administration was agreeable to the Law of the Sea.

And even police functions of the world government are slowly coming into being. In various places, the U.N. has a peace-keeping force.

Kargon: I was going to ask—Do you think the world really is becoming more homogeneous, that increasing communication and intereconomic linkages really are making a world which—maybe there are reverses—but which in a sense is advancing slowly toward . . . moral homogeneity, let's call it.

Diwan: The world is certainly becoming more homogeneous. You can travel in different parts of the world without feeling lost. That is true.

Cureton: Are we agreed that it's a good thing?

Kargon: It makes empire obsolete.

Vlahos: Or the wave of the future. If world government is to be the universal empire of the future, with all of its attendant ills, as well as its bonuses—

Rahe: The question is, can world government be established short of world tyranny?

Vlahos: That's what I'm wondering.

Cureton: Let me raise a question. Louis, you took a stab earlier today at a specific policy implication, that is, the focus on consultative process. Does our discussion hold any other implications for U.S. policy-makers today?

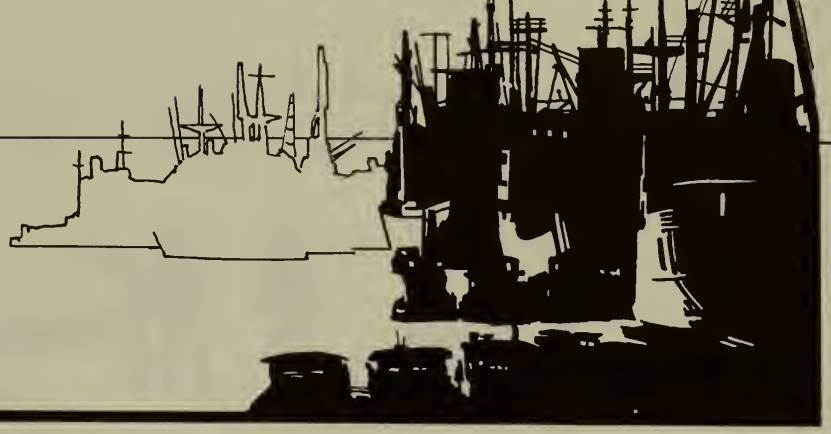
Goodman: There are four areas that I can think of. One is to be consultative in international decision-making. The second is taking policy steps that make it more and more difficult to get into nuclear conflagrations. The third is taking steps to help limit population growth. Each of these is a kind of cultural imperialism, but I think that population limitation is an important one. And the fourth is encouraging food production research.

I think if these problems were alleviated, we'd have a better environment in which to build a world order.

Rahe: I think your analysis leaves something out, as all economic analysis does, because it assumes that if we do away with poverty, things will be just fine and people will be our friends.

Goodman: I didn't say that was the whole answer. But I don't think beliefs about religion or nationalism or anything else, no matter how deeply held, make solutions impossible. Working to solutions sure is a tough task, but it's not impossible.

Rahe: I very much doubt that, because there is the matter of honor. And honor is tied up with nationalism and sometimes with religion. For example, by the standards of India, north-



As American power declines, traditional regional hostilities will be reasserted.

ern Ireland is prosperous. Yet you have a continuing civil war between two political communities that speak the same language, but seem to be grouped by religion. Lebanon is a very prosperous place, by the standards of the part of the world that it's in, and yet they're at each other's throats.

Cureton: So, Paul, what do you see as the implication for American policy? What's honor in an American context?

Rahe: Well, I think because we lack a civil religion, and because our sense of being a people is based on principles, we are almost ecumenical in those principles. For example, the Declaration of Independence makes a statement not about the rights of Americans, but about the inalienable rights of human beings as human beings.

That makes us very peculiar. We happen to live in a sea of people who do not share that ethos, although we tend to think they do.

Kargon: I want to get back to the question of policy that we started to address. From ideas we've been kicking around today, what policy postures do you see for the United States?

Vlahos: We've first got to decide where the world's going. If you look at the world as beginning to devolve, and our own control over the world political system as becoming more and more attenuous, then I think it behooves the United States to be as conciliatory and consultative as possible, but to start creating some kind of fallback position. If you have a more optimistic view, then you can take policies on a different level.

Kargon: Any policy program we embark on will have to be consonant with what we might call our national character, which is a complex of politics and culture and economics. I think we do have a secular religion in the United States, and you can see it beginning in the early 19th century—and that secular religion, since we had no past, is the conviction that we have a future. We are probably the most future-oriented country in the world. I have a suspicion that what we've lost is our future. Somehow we don't believe we have a future in the same sense that we used to.

Vlahos: That future was the regeneration of the world, ultimately.

Kargon: Yes. That was our Messianic thing: We believed that we were a sort of chosen nation. And I think we're going to have to go with that and make the best of it. We're going to have to recapture the future, become a kind of magnet culture. Put ourselves forward as an example—not by force, but by example—by putting our own house in order.

Thibault: Isn't that really what we've always done? We grouse, but the grousing is essential to doing it. Remember in the late '50s, how the Doomsday talk was much worse, right? And vulnerability was felt even more strongly then. And that was Kennedy's message: that we are not weak. That we will help.

Kargon: What's happened since Vietnam is that we've declined economically. We've abandoned world leadership in certain aspects of education, and certainly our relative economic position has declined.

Goodman: And our charismatic leaders have been killed.

Kargon: I go along with Brecht: Pity the country that needs a charismatic leader.

Vlahos: You're missing the central point. Putting the house in order has to have a higher romantic or emotive vision under which all is subsumed. And this is where the charismatic leader comes in—maybe we don't need him, but we need somebody or some school or some group to come along that will articulate not just the needs, but the vision.

Diwan: I think that's what we need, really. Some sort of respect and optimism for the future.

Cureton: But isn't this in some perverse and easily misunderstood way a kind of new imperial policy?

Kargon: The characteristic of empire is force, and I'm not talking about force. If they want to be like us, without our forcing them, why is that bad?

Hancock: What nation has the proverb that says, power lasts ten years, influence lasts a century?

Kargon: I think power is an illusion.

Rahe: I'm much more concerned with the fallback position, and it seems to me it has to be economic nationalism. Those with influence over the economy should foster our capacity to rely on our own resources. We should foster those institutions and skills and capacities that would allow us to fall back on, for example, coal to keep heavy industry running, if we did not have access to oil. We have a withering steel industry, withering coal industry—

Thibault: Right. The old-line industry's just passing away.

Rahe: And I'm opposed to the notion of us as a technological giant in an international economic order where we do grain and micro-chips and get our iron and steel from Korea. I'm worried about that.

Goodman: You don't put all your eggs in one basket, and we do need to figure out which industries we want to foster—but neither can we produce everything.

Diwan: In the last analysis, putting your house in order comes down to developing an economic base rather than a stronger military base, which is the difficult part. A serious problem is that we are losing our industrial infrastructure, and the investment required is unbelievably large. We may not have those resources. Very soon, in five to seven years, the crisis will come, and we may have to choose between our lifestyle and maintaining our world position. They estimate that 70 trillion dollars is the investment needed just to maintain the existing bridges, highways, tracks—that's a huge investment.

Thibault: Well, perhaps we'll let the elderly starve.

Diwan: I'm not convinced we need to make those choices. We can do everything we need to do—it's just that we spend too much on defense. If you were to look at all the objectives of national defense—A, security, B, the security of our allies, C, influence in various countries, and D, you can add anything else you want—the expenditures we are incurring are far, far larger than are necessary to satisfy our objectives.

Vlahos: Not by the standards of the rest of the world.

Diwan: Why should we worry what the rest of the world thinks?

Vlahos: Nations spend as much as they can on defense not only because they live in an apparently chaotic and insecure world, but because it's very difficult to spend what you consider enough on defense. You're always putting in those extra marginal bucks, just in case. That's why a lot of very poor countries who can't afford it at all, are killing themselves, because that extra margin of expenditure may be the margin that nets them security in the future.

Goodman: If we're engaging in futuristic scenarios, there's the theory that one reason for this focus on defense is to create a world economy in which the only way to stimulate your economy is through defense expenditures. Since Russia and the United States are the only nations big enough to make that work, this would make the whole rest of the world dependent on the United States and Russia.

Rahe: Nevertheless, if you look at current military expenditures, they are meant to serve the transnational economic order. Most of the money that the Reagan administration proposes putting into the military is being put into the Navy, and the function of the Navy is freedom of the seas.

Thibault: What do you vote for, lad?

Goodman: Survivalism.

Vlahos: I'm getting pretty pessimistic. This endless litany—not litany, but the frequent announcement of American decline makes me wonder whether the post-1945, 1950 world was in fact *the* high stage of the West. Then we came closest to creating not simply an imposed ecumenical order but the one that was accepted. I wonder whether we're facing a period of collapse and crisis, in which regional empires will become the political canvas of the future, if not the economic structure.

I even wonder if it's no longer possible for the U.S. to avoid the true imperial mantle. I don't think America has been an empire in the classic sense, but rather the leader of a worldwide federation. But now that we are in some sense declining, that very loss of ascendancy may lead us to formalize our structures, so that we go into a period of real empire.

Kargon: I think we are coming to see that the urge to rule is a snare and a delusion that's more trouble than it's worth. We're not going to be the only ones to come to that conclusion in the next half-century or so.

Rahe: I began with Thucydides and I'm going to end with Thucydides. This is another passage from the Melian Dialogue, where the Athenians address the Melians. They say, "Hope, that comforter in danger! If one already has solid advantages to fall back upon, one can indulge in hope. It may do harm, but it will not destroy one.

"Hope is by nature an expensive commodity, and those who are risking their all on one cast find out what it means only when they are already ruined. . . . Do not let this happen to you, you who are weak and whose fate depends on a single movement of the scale, and do not be like those people who, as so commonly happens, miss the chance of saving themselves in a human and practical way, and when every clear and distinct hope has left them in their adversity, turn to what is blind and vague, to prophecies and oracles and such things, which by encouraging hope lead men to ruin."

WPI CLASS NOTES

WPI Alumni Association
President, Peter H. Horstmann, '55
Senior Vice President,
Harry W. Tenney, Jr., '56
Vice President,
Donald E. Ross, '54
Secretary-Treasurer,
Stephen J. Hebert, '66
Past President, John H. McCabe, '68

Executive Committee members-at-large
Henry P. Allessio, '61; Philip B. Ryan, '65; John M. McHugh, '56; Anson C. Fyler, '45.

Fund Board
Henry Styskal, Jr., '50, chair; Richard B. Kennedy, '65, vice chair; Gerald Finkle, '57; Allen H. Levesque, '59; Philip H. Puddington, '59; Richard A. Davis, '53; C. John Lindegren, '39; John M. Tracy, '52.

50th Reunion of WPI '32

Who said you can't turn back the clock? Seventy youthful and energetic men and their spouses disproved that theory at our 50th reunion in June.

Moreover we won the prize for the highest percentage of living members attending reunion weekend festivities among the major reunion classes—the 25th, 40th and 50th. We also chose officers for the 55th reunion. We regret that illness in their families kept some of our classmates away.

The Sheraton-Lincoln Inn was the setting for a relaxed afternoon of greeting and chatting with old friends as they signed in on Thursday. A gracious reception was held in the evening at the home of President and Mrs. Edmund T. Cranch, followed by a superb roast beef dinner at Higgins House on the campus. Later, updates on what WPI has been doing and what it hopes to attain in the future were presented. When we were transported back to the hospitality suite at the Inn, admittedly not many stayed up into the wee hours of the morning.

On Friday, a walking tour of the campus—resplendent in spring growth—evoked nostalgia. Scientific equipment—undreamed of by us as students—plus many new buildings, additions and renovations were a revelation. WPI *is* keeping up-to-date! Following an abundant buffet, mini-courses and a trip to Alden Research Laboratory were available. Our own class banquet was held at the Sheraton-Lincoln Inn in the evening. Professor John van Alstyne was our speaker. An eloquent invocation listing our deceased classmates was delivered by our banquet chairman. Prizes in various categories evoked joviality and good humor.

On Saturday, we became the youngest members of the 50-Year Associates, heard enchantingly bright coeds tell of their experiences at WPI, learned more about the WPI Plan, and joined in the general reunion luncheon.

See you all at the 55th!

—Edwin Tucker, Reunion Chair

1908

Sumner Davis, who recently celebrated his 97th birthday, is one of the longest serving Boy Scout leaders in America. For 30 years he was a scoutmaster. Later he was a merit badge examiner, a member of several BSA councils and chairman of the Sea Scout committee. In 1933 he won the BSA Silver Beaver Award, the highest scouting honor an adult can receive. He helped to organize the Sea Scouts, the forerunner of the Explorers, a scouting organization for older boys. Currently located in Lexington, KY, in 1973 he published a 350-page family genealogy book which he compiled from documents dating back to 1599.

1921

Ricardo Pereira has moved from Rio de Janeiro to Curitiba, PR, Brazil.

1923

The **Howard Nuttings** spent the winter in Laguna Beach, CA.

1925

Sigurd Wendin is a valuation specialist with Sigurd R. Wendin & Associates, Inc., Detroit, MI.

1926

Bill Crabtree is serving a three-year term as a member of the Wilmington (NC) Transit Authority. Last October he was elected president of the Wilmington Golden K Kiwanis Club.

1927

Charles Parker continues as a self-employed patent attorney in Kensington, MD.

1929

Arthur Gilbert, Jr., consults two or three days a week at Cheatham Electric Switching Device Co. of Safetran Systems, Inc., Louisville, KY.

1930

Last year **Ralph Gilbert** retired as president of Modern Concrete Pumping Co., Inc., Newington, CT.

Eugene Lowe, Jr., retired in January as an electrician at Bemis Co., Inc., St. Louis, MO.

Walter Rutman holds the position of president at Herald Press, Inc., Pawtucket, RI.

1931

Jay Harpell continues as an electrical engineer for TMSI Arabia, in Dhahran, Saudi Arabia.

1933

Hugo Borgatti retired from UniRoyal in 1974. Before his wife, Catherine, passed away last year, they spent a happy retirement traveling. Hawaii, Las Vegas and Ireland were some of the places they visited. Currently, Hugo lives in Dunedin, FL, where he plays lots of golf.

The **Bob Fultons** reside in Portland, ME. They have an interest in genealogy, and have learned that she has a direct family line back to the Mayflower and that he has four. They both belong to the Mayflower Descendants.

Don Haskins reports from Brigham City, UT, that he and Eleanor are grateful to have enjoyed good health in five years of retirement. "We have become trailering enthusiasts, although not full-timers. Each year we have spent two months or more visiting Florida, Canada, Mexico, New England and the Pacific Northwest, Arizona and Hawaii." On one trip they saw **Frank Roberts** and his wife and Bobbie

Eric Soderberg— "Citizen of the Year"

He is "Eric" of a formidable United Way fund-raising force known as "Eric's Raiders," a guiding light in his Rotary Club's scholarship program and an enthusiastic volunteer for Recording for the Blind. In short, he is Eric Soderberg, '35, Milford, Connecticut's 1981 Citizen of the Year.

When the local newspaper, the *Milford Citizen*, invited nominations for its coveted award, Soderberg's name was among the finalists. A spokesman for the newspaper reported, "After an examination of [Soderberg's] activities, it became apparent that he was a clear choice for this year's award." His great service to the community made the judges' decision an easy one.

Along with his United Way activities, Soderberg is energetically involved with the Milford Rotary, for which he has served as president. He is especially interested in the annual scholarships that the Rotarians award for study abroad and says, "We've got to make this world smaller if we are to get along."

Another of his pet projects is Recording for the Blind, in which books are read aloud and taped for the enjoyment of the blind and handicapped. During the recording session, he works as a monitor, following the text for accuracy and interpretation, while a partner reads aloud.

A Worcester native, Soderberg holds a BS in mechanical engineering from WPI. He is married and the father of a son and two daughters. Soderberg got into the plastic molding business early in his career, "thanks to a Portuguese interviewer who had it in his head that all Swedes were mechanically talented." He later went on to become a partner in Newburgh Molded Products in New York, from which he is retired as treasurer.

His "retirement" is as busy at home as it is in the community. He has traveled to Europe, is planning a trip to Mexico and would like to go to Israel. But he always spends summer at home in the Laurel Beach section of Milford. "Love the neighborhood. Who would want to leave such a beautiful place in warm weather?" Certainly not Eric Soderberg, a manager of the Laurel Beach Association and Greater Milford's Citizen of the Year.

and **George Lyman** joined them on their trip to Mexico.

Sumner Norton is still working as a sales representative for Potdevin Machine Co. in Teterboro, NJ. He lives in Chappaqua, NY. Besides playing golf with a handicap of 18, he is actively engaged in bridge competition aiming to become a Life Master.

Wes Reed retired from American Optical seven years ago and is living in Woodstock, CT. He collects and restores antique musical instruments and cuts wood for auxiliary heat. With Wes an engineer and his wife an artist, their interests in old civilizations have led them to travels through Europe, the Greek Islands and more recently the Mayan ruins in Yucatan on a Smithsonian tour.

In December Judge **Joseph Virostek**, the first Justice of the Uxbridge (MA) Division of the District Court Department, reached mandatory retirement age. He was named to his latest post in 1979 after having served as a full-time special justice for two years. He graduated with his LLB from Northeastern University in 1942 and was admitted to the Massachusetts Bar the following year. In 1969 he was appointed a judge. From 1943 to 1977, he was also in general practice of law. During his career Judge Virostek has served as town clerk, town accountant, state senator from Worcester's 4th District, town counsel and assistant district attorney of Worcester County.

Sumner B. Sweetser, Class Secretary

1934

Leonard Almy now resides in Costa Rica, Central America.

G. Standish Beebe holds the post of executive coordinator of the New England Construction Users Council. He resides in Gales Ferry, CT.

1935

Karl Bohaker writes that he has five granddaughters and a four-year-old grandson who can ski. "Also we have a two-year-old great-grandson in Golden, CO, who will be a skier."

1936

Carl Borden, retired from du Pont's textile fibers division, is currently the senior vice president of the National Alliance of Business (NAB), which sponsors job programs for minorities and the hard-to-employ.

C. James Ethier serves as chairman of the board of Bush Bros. & Co., Dandridge, TN.

Alan Shepardson was in Schwaz, Austria, last summer doing some grinding wheel work for Schleifmittelwerke Swarovski. He says that Schwaz is right in the middle of the Tyrolean Alps, not far from Innsbruck.

1937

Morton Fine, formerly with Morton S. Fine and Associates, Inc., Hartford, CT, has been appointed program manager of WPI's new Manufacturing Engineering Applications Center, which offers students hands-on experience in industrial robotics.

Fran Harvey, a WPI trustee emeritus, was recently appointed a co-chairman of the corporations/banking subscriptions committee for the St. Vincent Hospital amphitheater and medical library campaign in Worcester. He will lead the committee members in raising funds to build and equip the $1.2 million educational health sciences facility.

Carl Larson, Jr., is president of Growth Enterprises, Inc., Glastonbury, CT.

Foster Powers has retired after 43 years with Industrial Risk Insurers. He writes: "With activity in the Masonic bodies and church and civic organizations and semi-skilled puttering around the house and grounds, I have no trouble occupying 'leisure' time."

After 40 years of designing dams, **Oliver Raine** retired from the Dams Division of the Tennessee Valley Authority in April 1980. He had been connected with the design of TVA's highest, the 480 ft. Fontana concrete gravity dam, and large earth and earth-rockfill dams, some up to 320 ft. high. Three federal boards were created to help with dam safety, with **Ray Linsley, '37**, serving on one of the panels of outside experts. Raine had a major hand in all of the TVA inputs to the three main reports and was the lead compiler and editor of the final report, entitled: "Federal Guidelines for Dam Safety." He is currently located in Knoxville, TN.

M. Blair Whitcomb retired last July after 43 years with GE. He was concerned with incoming material quality control for the last 11 years at the GE Charleston (SC) large steam turbine department plant. Besides travel, Whitcomb enjoys woodworking.

1938

After 14 years with Wentworth by-the-Sea in Portsmouth, NH, **Dick Court** is now in the sales and marketing department at the Lake Morey Inn and Country Club on Lake Morey in Fairlee, VT.

Werner Held is a visiting instructor at the University of Montana in Missoula.

1939

Harrison Brown is now a tour guide at the Alabama Space and Rocket Center, "the best museum of space in the country."

John Driscoll is a consultant with J.M. Driscoll Associates, Westport, CT.

Roger Kelsey, a retired plant engineer for B.F. Goodrich Corp., is currently building yachts at Kelsey's Marine Railway, Short Beach, CT.

Dick Wilson, who retired as district staff engineer from Long Beach Unified School Community last September, continues as secretary of an ASME national committee and as a Pacific Region Policy Board member. In November he chaired a panel session at the ASME Winter Annual Meeting in Washington, DC.

1940

Edward Cross serves as treasurer of Alden Electronic & Impulse Recording Equipment Co., Inc., Westboro, MA.

Willard Gove is vice president of corporate real estate and field administration at Honeywell, Inc., Minneapolis, MN.

Zareh Martin recently retired from industry, but is now "continuing my instruction at Northeastern University in the areas of mathematics, production management and value engineering."

1941

Dr. **George Cowan** was recently named to a one-year term on the White House Science Council which advises President Reagan's science advisor, Dr. George Keyworth, on major technological issues. He is a laboratory senior fellow at Los Alamos National Laboratory and has held teaching assistant and research scientist posts at Princeton, the Metallurgical Laboratory of the University of Chicago, Columbia University and the Carnegie Institute of Technology (now Carnegie-Mellon), from which he received his PhD in physical chemistry.

Leslie Harding is now a general manager for the U.S. Postal Service in Atlanta, GA.

Russell Parks is director of the project engineering division at Procter & Gamble,

E. Alvin Rich is sales manager for Lightning Elimination Associates, Inc., Santa Fe Springs, CA. He is a professional engineer in Massachusetts and California.

Ralph Stinson continues with Emhart Industries and is currently located in the Republic of Singapore.

1943

Mike Brautigam has retired from Pratt & Whitney Aircraft after 27 years of service. At his retirement he was with the financial department handling engineering department contracts with the government. Although their permanent base is a log cabin in Pawlet, VT, the Brautigams enjoy travel and in the last two years have been on a cruise in the Bahamas and to a family reunion in Frankfurt, Germany, which was attended by some 60 relatives, including his brothers, **Bob, '41,** and **Larry, '49.**

H. Henry Ferris, Jr., holds the position of vice president of the Bache Group of Prudential, La Jolla, CA.

Burton Wright, formerly with GE as a senior design engineer, is now retired and residing in Lanesboro, MA.

1944

Currently **Newton Burr** is a management consultant at Profit Management Development in Barrington, IL.

Richard Carson serves as a chief project engineer in the engineering department at Texaco, Inc., in Houston.

Alfred Larkin has retired as vice president of the international division at Rexnord, Inc., Milwaukee, WI. He is now consulting part time.

John Lee, who is retired, currently resides in Pt. Charlotte, FL.

Miles Roth is director of information systems at Marlin Firearms Co., North Haven, CT.

1945

James Breed works as a quality assurance engineer for Kaiser Engineers Hanford of Richland, WA.

Dr. **Ernest Kretzmer** holds the post of director of customer systems research at Bell Labs in Holmdel, NJ.

Eugene Logan is employed as general manager of construction at Public Service Electric & Gas, Newark, NJ.

1946

John Barrett, Jr., is president of Barrett Consultants, Inc. He is located in Reading, MA.

Currently **Richard Brown** serves as a technical integration manager at GE in San Jose, CA.

Robert Hayward holds the position of vice president at Delafield Harvey Tabell, Philadelphia.

Frank Whiting is a transitman surveyor for L. Perkins & Son Civil Engineers. He is headquartered in Hingham, MA.

1947

John Harding, Jr., is vice president and chief scientist at Litton Data Systems, Van Nuys, CA.

H. Edwin Johnson is now a program manager at Honeywell Information Systems, Phoenix.

Robert Mark is manager of non-union employee relations at GE in Fairfield, CT.

Donald Thompson is the president-owner of Bycroft Enterprises, Inc., Simsbury, CT.

1948

Richard Atwood serves as senior specialist engineer at Boeing Aerospace in Seattle, WA.

Roger Cromack, account executive in the Major Account Division at Marsh & McLennan's New York office, has been named a managing director of Marsh & McLennan, Inc., the world's largest insurance broker. He is a member of the WPI Alumni Council.

Thomas Grove, Jr., is an engineering associate in the Engineering Division at Kodak in Rochester, NY.

Leon Lipton continues as a graduate student at the University of Arizona, Tucson.

1949

Russell Bradlaw continues with Turner Construction Co., Houston, where he is project manager.

Gordon Duncan has retired from Pratt & Whitney Aircraft. He is residing in North Palm Peach, FL.

James Genser works as a project manager at Kintech Services, Inc., in Cincinnati.

40th Reunion of WPI '42

The hurricane of 1938, the undefeated WPI football and soccer teams of the same year, A. J. Knight, Doc Masius, Charlie Allen, Carberry's Pub, ground-breaking for Alden Memorial, burning of the "sanitary lab," and Marlboro Country Club with the "dancers" were all topics of conversation when '42 held its 40th Reunion in June.

It's true: the rains started Friday afternoon and continued through the weekend into Tuesday, before Ray and Dottie Arey could get their plane airborne and back home to Maryland. But spirits were high, conversation was animated, flash guns were popping, and nobody cared about the weather!

Friday evening, at the home of President Edmund and Virginia Cranch, we were welcomed back in the very rooms where, as brand-new grads, we were guests of Admiral Cluverius. Then, to the Higgins House, where some 2,000 clams and 80 lobsters insisted on being sacrificed in a magnificent clambake. Resplendent in our '42 "bibs," we overcame those shelled monsters, with the help of Frank Aspin's expertise.

Our hospitality suite in Ellsworth almost never stopped entertaining! Friends came and went—visiting campus, participating in seminars, and driving around looking for old familiar places. Bob Allen was one of the stars of the Reunion Luncheon as he presented 1942's gift to WPI, he noted that the money will be used as scholarship endowment.

On Saturday evening, our Class Banquet at Tatnuck Country Club witnessed the unveiling of beautiful Class of '42 40th Reunion plates and the election of five-year class officers: Ray Arey, Pres.; Bob Chaffe, Vice Pres.; Roy Bourgault, Secretary; Bob Allen, Treasurer. Professor Emeritus Bill and Eva Locke were our guests. And coach Bob Weiss, speaking informally, gave a fine picture of WPI football today.

Sunday morning's brunch featured affectionate good-byes and thoughts of how our 45th can be as wonderful as our 40th.

—Roy Bourgault, Secretary

Now retired as technical director of the Electronic Systems Division, Hanscom AFB, **Murad Piligian** is currently a self-employed consultant in Needham, MA.

Smil Ruhman is the Norman D. Cohen Professor of Computer Science at Weizmann Institute of Science in Rehovoth, Israel.

Donald Weikman is vice president of Midwestern Gas Transmission Co., Houston.

1950

Richard Amidon is currently a consultant for management operating systems at R.E. Amidon Associates, Hancock, NH.

Recently, **Bill Bowen** retired from Torrington Co. after 31 years. He now heads Bowen Consulting in Harwinton, CT.

David Danielson works as a senior engineer in the Nuclear Fuel & Services Engineering Department at GE in San Jose, CA.

Richard Jones is employed as an R&D engineer at John J. Riley Co., a subsidiary of Beatrice Foods, Inc., Woburn, MA.

Paul Seibold is a senior systems engineer at Riley Stoker in Worcester.

Henry Styskal, Jr., has been named president and chief executive officer and elected to the board of Metritape, Inc., Concord, MA, a manufacturer of gauging and control systems. Previously he was president of Teledyne TAC, a maker of automated equipment. He serves as chairman of the WPI Alumni Fund Board.

1951

Robert Baldwin is director of sales at Heat Research Corp., a member of the Wheelabrator-Frye group of companies in New York City.

Richard Coffey, Jr., is manager of technology for Monsanto Co., Indian Orchard, MA.

Richard Howard was a co-recipient of the David W. Armstrong Award from the Worcester Boys' Club in April. The award is presented "to former members whose achievements in adult life were influenced in a significant way by their active years of membership in the Worcester Boys' Club." Howard is president of Therm, Inc.

1952

Everett Bagley, continuing with du Pont, is now systems consultant for the firm in Wilmington, DE.

Monroe Dickinson holds the post of director at Owego Laboratory, IBM Corp., Owego, NY.

W. Dieter Hauser is vice president of engineering and administration at KOA Speer Electronics, Inc. in Bradford, PA.

Dick Cloues Retires From Bechtel

Richard "Dick" Cloues, '38, a lifetime member of the WPI President's Advisory Council, has retired from International Bechtel, Inc., following more than 16 years of distinguished service.

On the occasion of his retirement, the president of Bechtel Civil & Minerals, Inc. cited Cloues's accomplishments on a variety of domestic and international assignments, including project engineer with the National Steel pellet plant expansion in Keewatin, Minnesota, the Amman (Jordan) Civil Airport, Dubai (U.A.E.) International Airport Expansion and the Guri Dam project in Venezuela.

He has met professional requirements for registration in ten states, including Florida, New York and California, and he has presented numerous papers before the National Society of Professional Engineers and other professional organizations. His article, "Engineering Ethics: Can It Be Defined?" was published in *Civil Engineering Magazine* in 1956. He has been listed in *Who's Who* since that year.

Dick Cloues's private life has also been busy. He has served the church in many capacities. He is a Mason, and he has been a member of the United Christian Missionary Society. Active with the Boy Scouts of America, other interests have included the Parent-Teachers Association (PTA) and United Fund drives. Pastimes include camping, canoeing, gardening, swimming, reading and bridge.

A native of Shrewsbury, Massachusetts, Cloues is married to his "college days sweetheart," the former Doris Dickinson of Westboro. They have four married sons with families of their own. One son, Steve, a church planning consultant for the Baptist Association Council, Birmingham, AL, received his BSCE from WPI in 1965.

In January, after his retirement from Bechtel, Cloues and his four sons set up a family corporation, Cloues & Sons Enterprises, Inc. in Millbrae, California. Cloues is now president, director and chief executive officer of this land development company.

Lester Lloyd, Jr., holds the position of regional director for the U.S. Bureau of Reclamation, Boise, ID.

1953

David Beach holds the post of program manager of consumer products at Kodak in Rochester, NY.

Dr. **Michael Hoechstetter** is a product coding specialist at Ashland Chemical Co., Columbus, OH.

Kenneth Shiatte serves as director of the transit division for the New York State Department of Transportation. He is located in Albany.

1954

Walter Dziura is manager of field equipment and R&D at Scovill Mfg. Co., Apparel Division, Watertown, CT.

John Herz, vice president and general manager of Times Fiber Communications, Inc., Wallingford, CT, has been named head of the newly created Communication Systems Division of the firm. The new division is composed of design, development, engineering and production of optical fiber and cables, opto-electronic components, test instruments and communications systems.

Currently, **Richard Kirk** is an advisory engineer for IBM in Boca Raton, FL.

Edwin Shivell serves as a department staff general engineer at USN Underwater Systems Center in Newport, RI.

1955

George Carlson serves as a cost consultant for Wolf New England in Worcester.

Peter Horstmann's daughter, Heidi, has been chosen one of the 48 winners of a National Merit Scholarship in Massachusetts. Only 1,800 scholarships are awarded nationally each year. A senior at Wachusett Regional High School in Holden, Heidi has also been named a recipient of the prestigious *Worcester Telegram and Gazette* Student Achievement Award. Horstmann is vice president of Coppus Engineering Corp., Worcester, and president of the WPI Alumni Association.

Bruce Sealy is now a senior marketing representative for Wang Laboratories in Creve Coeur, MO.

1956

Ted Coghlin, a member of the President's Advisory Council at WPI, received the Harry G. Stoddard Award from the Worcester Boys' Club in April. The award recognizes superior community service. Coghlin serves as a director of the Worcester Boys' Club, of the Worcester Science Center and of the Mechanics Bank. He is president of Coghlin's, Inc., Worcester.

Gerald Dyer of Dyco Industries is located in Weston, MA.

James Green is now a senior manufacturing

25th Reunion of WPI '57

Imagine a formal luncheon for over 400 men and women about to begin. A bagpipe band provides formal accompaniment for the procession of dignitaries marching toward the head tables. Unexpectedly, as the master of ceremonies approaches the podium, 121 of the guests rise, put kazoos to their lips and play "Yankee Doodle." This uninhibited group are 64 members and wives of the Class of '57 enjoying this and every other moment of reunion weekend.

The weekend's rainy weather couldn't dampen the warmth of friendships rekindled. Thursday evening, following an elegant cocktail party at President and Mrs. Edmund Cranch's home, we regrouped at the Worcester Country Club for an evening of good company, scrumptious roast beef and singing of "Fifties" drinking songs. We'll never forget the magic of that moment, which reduced a 25-year gap to "only yesterday."

Faces from the past who joined us for the Saturday dinner dance included Dean William Grogan, '46, Ernie Hollows (who came from Ohio for the entire weekend), Merl Norcross, and their wives. Merl, as guest speaker, brought back old memories. The athletes of the class played golf and tennis on Friday, followed by a clambake feast in Morgan Hall that evening. Nils Hagberg, a retired campus policeman, was our guest. He prevented a riot as the now retired original goat's head made a surprise appearance. A banjo band entertained during dinner and at the Goat's Head Pub afterward. Our hospitality suite stayed open into the early morning hours for conversation and libations.

At Sunday brunch, we realized that in the short span of 60 hours, we perhaps understood and appreciated each other better than during the often hectic days of 1953–57. Many promised to return again soon, perhaps for Homecoming this Fall. Hope to see you there!

—Michael Stephens, Reunion Chair

engineer at Polaroid Corp., Norwood, MA.

Harry Tenney, Jr., holds the position of industry manager at Allied Corp.-Fibers & Plastics, Morristown, NJ. He is senior vice president of the WPI Alumni Association.

1958

Roger Alvey is president of Codex Graph Papers in Norwood, MA.

Norman Howe, Jr., continues as an associate professor of chemistry at Central Virginia Community College, Lynchburg, VA. For three years he has been teaching fire science courses at the college, and he is often called upon by area firefighters for expert advice.

James Johnson continues with New Jersey Bell, where he is division manager of security and audit.

Artist **Bill Rabinovitch** recently exhibited his work at one-man shows in La Residence Restaurant Gallery and the private gallery of Neil Pearson, Esq. in New York, at Manufacturers Hanover Trust, the International Running Center and the Alain Bilhaud Gallery.

John Vesey is principal at Keystone Christian Academy in Berryville, VA.

1959

Continuing with Hazeltine, Corp., **James Bean** is now system engineer for the firm in Greenlawn, NY.

Donald Carignan's company, Instrument Technology, Inc., Westfield, MA, is currently a leader in supplying remote viewing systems to the nuclear industry on a worldwide basis.

Dr. **David Evensen** continues with Hughes Aircraft Corp., El Segundo, CA, where he is senior staff engineer.

Toby Kramer serves as a department head for the Eaton Corp. AIL Division in Deer Park, NY.

Norman Monks was recently elected president of L. Hardy Co., Worcester. The former manager of Rexnord, Inc., Roller Chain Division, he has more than 22 years of experience in manufacturing, management and engineering. He is president of Junior Achievement in Worcester, as well as a director of the Mohegan Council, BSA. His company, L. Hardy, manufactures shaving and fleshing blades for the leather industry and circular knives.

Ernest Woodtli, still with GE, is currently manager of advanced manufacturing engineering for the firm in Bloomington, IL.

1960

Edward Donoghue is now an OEM marketing manager for Digital Equipment Corp., Marlboro, MA.

Currently, **Murray Elowitz** holds the post of manager of the TRW Space and Technology Group. He is headquartered in Redondo Beach, CA.

Daniel Gould is employed as a senior industrial engineer at the Instrumentation Laboratory in Watertown, MA.

Edmund Lumley, III, works as a senior investment analyst for Union Carbide, New York City.

Robert Magee is employed as senior engineering manager for the General Technology Division, a division of IBM in East Fishkill, NY.

John Reisinger holds the post of division manager at Southern New England Telephone Co., Hamden, CT.

Stanley Wells, Jr., is employed as manager of development engineering for Deseret Polymer Research Division, a subsidiary of Warner-Lambert Corp., Dayton, OH.

1961

John Buckley is now director of Black & Webster, Inc., Waltham, MA.

Robert Hale works as a member of the technical staff at Jet Propulsion Laboratory in Pasadena, CA.

Alan Matley is affiliated with Aladon Corp. as a consultant. He is located in Wellesley Hills, MA.

Currently, Dr. **Timothy Meyers, Jr.**, is associate professor in the department of orthodontics at Emory University School of Dentistry in Atlanta.

Dr. **Gordon Parker** serves as division manager of development and quality control at Essex Chemical Co., Sayreville, NJ.

Richard Souren is vice president of manufacturing for Rutherford Machinery, a division of Sun Chemical Corp., East Rutherford, NJ.

Wayne Taylor is employed as a senior engineering specialist at Ford Aerospace & Communications Corp., Newport Beach, CA. He resides in Costa Mesa.

1962

John Brennan is an associate professor of physics at the University of Central Florida in Orlando.

Victor Castellani is president of V. B. Castellani & Company, Inc., Boston.

Andrew Edelman holds the post of manager of the pension department at Bruns Nordeman REA & Co., a division of Bache, in New York City.

Thomas Holland has joined Boeing Aerospace Co., Seattle, WA. Previously he was employed at Person & Person, Inc.

William Krein holds the post of vice president and controller at Zenith Radio Corp., Glenview, IL.

Donald Marcy serves as a relocation sales representative at R.L. Schlott Realtors, Inc., Summit, NJ.

Continuing with IBM, **Nelson Parmelee** is now program manager in White Plains, NY.

Harold Reynolds, Jr., is manager of Advanced Programs at United Technologies Research Center in West Palm Beach, FL.

Thomas Tully serves as director of operations at Computer Transceiver Systems. He is located in Paramus, NJ.

1963

Anthony Allegrezza continues as a senior research scientist at ABCOR, Inc., Wilmington, MA.

David Dunklee, Jr., lectures at Arapahoe Community College, Littleton, CO.

Currently, **Paul Hausner** is employed as marketing product manager for Steelcase, Inc., Grand Rapids, MI.

Russell Hokanson, transferred to Wilmington, DE, as a design liaison supervisor last May by du Pont, now coordinates projects being engineered in Wilmington for the reactor department at the Savannah River plant in South Carolina.

Stephen Kaufman is president and chief executive of Color Technology, Inc., Westboro, MA. He resides in Sharon.

R. Michael Malbon is manager of R&D at Avantek, Inc., Santa Clara, CA.

Robert Mellor writes: "I will graduate from the WPI SIM program in May of 1982."

Formerly a department manager at Northrop Corporation, **Richard Norton** is now the owner of R. J. Norton Co., Topanga, CA.

Dr. **Roger Weiss** is a technical supervisor at Bell Telephone Labs in Whippany, NJ.

1964

Continuing with Continental Can Company, **J. Michael Anderson** is currently manager of marketing and sales for the firm in Stamford, CT.

Thomas Baron works as a contract engineer for the MDC, Water Division, Commonwealth of Massachusetts in Boston.

David Gendron works as manufacturing superintendent at Monsanto, Indian Orchard, MA.

Thomas Hopper is employed as an engineering manager at GCA Corporation in Bedford, MA.

Daniel King works as a project manager at Stone & Webster Engineering Corp., Boston.

David Monks, manager of project design in Kodak's Apparatus Division, was one of the developers of Kodak's revolutionary new disc camera which was unveiled in February. Monks is the son of **Norman Monks, '32**, and the brother of **Norman Monks, '59**.

John Ostrowski is employed as a principal engineer at Polaroid in Cambridge, MA.

Dr. **Robert Peura**, coordinator of Biomedical Engineering at WPI, won a three-way contest for a three-year seat on the Princeton (MA) School Committee in May.

F. Barry Sylvia is now a principal project engineer for Polaroid Corp. He is headquartered in Waltham, MA.

David Usher is currently the district operations manager for Vermont at New England Telephone, Burlington.

Stempel Takes the Wheel At Chevrolet

After spending 17 months in West Germany directing Adam Opel AG, a subsidiary of General Motors Corporation, Robert C. Stempel, '55, a WPI Trustee, has been called back to the States as general manager of the Chevrolet Motor Division, GM's largest manufacturer.

Chevrolet's new boss steered Opel through tumultuous times, overseeing construction of an assembly plant in Spain and a multi-billion dollar capital-improvement program in Opel plants elsewhere.

"Opel is back in the small-car competition in Europe," Stempel reports. The new plant will produce a front-drive car smaller than the Chevrolet Chevette. The Opel Ascona has just been introduced as the European version of the Chevrolet Cavalier, and a new small diesel engine is in production.

"Opel is in the midst of a product revolution that Chevrolet recently experienced in the United States." Stempel returns to Chevrolet as the division rebounds from a sales slump with a product lineup that is dramatically different from when he left.

Stempel joined GM in the Oldsmobile Division in 1958 and ultimately rose to Chevrolet's chief engines and components engineer and GM vice president. He helped design Oldsmobile's Toronado, GM's first front-wheel-drive automobile. As director of engineering at Chevrolet, he supervised the development of the downsized 1977 Caprice, the 1978 Malibu and the Citation.

"Those were exciting times," Stempel says, "but not as exciting as Chevrolet today. Now, as we concern ourselves with new production methods and relationships with our people, we're making history."

1965

Frank Benham, III, serves as a section head at Exxon Research & Engineering in Florham Park, NJ.

Donald Carlson holds the position of quality control manager, N.B. Europe, for Torrington Co.-Ingersoll Rand. He is located in Dusseldorf, West Germany.

Maj. **Eugene Dionne**, USAF, has completed his studies at the Air Force Command and Staff College in Montgomery, AL, and started his new assignment at the Pentagon.

Robert Gerdes holds the post of senior process engineer at PPG Industries in New Martinsville, WV.

William Hines, Jr., is employed as a laboratory manager at du Pont in Stow, OH.

John Kelley, III, holds the post of vice president at Nickerson & O'Day, Inc. He is headquartered in Bangor, ME.

Dr. **David Schwaber** holds the position of vice president of Baltimore-based Monarch Rubber Co., Inc.

Russell Trask is president of Electro Organ Service in Melville, NY.

1966

BORN: to Mr. and Mrs. **Grant P. Maier** a daughter, Erin Riley, on April 11, 1982. They also have an older daughter, Jennifer. Maier works as a project engineer at Pratt & Whitney Aircraft, East Hartford, CT.

Douglas Crowell is a project leader for Emhart Corp., Machinery Division, Beverly, MA.

Carl Hellstrom is manager of the transportation planning program for the Central Massachusetts Regional Planning Commission. He is located in Worcester.

James Loomis continues as general superintendent for Stone & Webster in Denver, CO.

Gerald Nimberg works as a business consultant for Computer Assistance Corp., Cherry Hill, NJ.

Chester Patch, III, still with Bechtel Power Corp., is now a technical manager for the company in Bay City, TX.

Previously with Armco Steel, **Richard Piasecki** is currently the self-employed president of Piasecki Steel Construction Co., Stuyvesant, NY.

Donald Ruef is supervisor of transmission and distribution for Sohio Alaska Petroleum Co., Anchorage, AK. He lives in Palmer.

1967

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Jose Alonso is a lecturer in computer science at Swinburne Institute of Technology in Hawthorn, Australia.

Dr. **Curtis Carlson** has been appointed head of the Image Quality and Human Perception Research Group at RCA's David Sarnoff Research Center in Princeton, NJ.

Paul Cherubini, newly elected to the board of trustees of the Clinton (MA) Hospital Association, was recently named president of the Standard Sign Company, Clinton.

Dr. **M. H. Dwarakanath** is now a principal engineer at Boeing Co., Seattle, WA.

Mukundray Patel serves as principal engineer for the fossil power system at Combustion Engineering C-E Power System, Windsor, CT.

Steven Schumer works as a technical services manager at Raychem Corp., Menlo Park, CA.

Duncan Vandenberg is employed as building superintendent at Dow Corning Corp. in Midland, MI.

1968

MARRIED: **John C. Barkus, Jr.**, to Patricia A. Quaranta in Worcester on January 23, 1982. The bride, a secretary at the University of Massachusetts Medical Center, graduated from Worcester State. John is a research assistant at Astra Pharmaceutical Products, Worcester.

BORN: to Mary Anne and **Walter Lynick** their first child, Michael, on Easter Sunday morning. Lynick is employed as a senior hydraulic engineer in the dam safety section at New York State Environmental Conservation, Albany.

Michael Annon serves as an electrical systems manager at Proto-Power Management Corp., Groton, CT.

Formerly with United Nuclear, **George Bazinet** is currently a senior systems planner with Combustion Engineering, Inc., Stamford, CT.

Wayne Blanchard holds the post of controller at Johnson & Johnson in Chicago.

John Burns serves as manager of San Diego (CA) Gas & Electric.

George Davagian, Jr., holds the position of vice president and chief engineer at Sutton Corporation, Acton, MA.

John Foley serves as project manager for Morgan Construction Co. in Worcester.

Robert Glamuzina is a project engineer on a 4-megawatt wind turbine at Hamilton Standard, a division of United Technologies, Windsor Locks, CT.

Formerly with Daniels Investment Services, **Steven Halstedt** is now a managing general partner in Centennial Management Co., Denver, CO.

William Krikorian is a principal civil engineer for the Commonwealth of Massachusetts, Division of Capital Planning and Operations, Boston.

Dr. **Michael Latina** continues as an associate professor at the Community College of Rhode Island in Warwick.

Currently, **Stephen Pytka**, who has an MBA from Dartmouth, is product manager at Wang Laboratories, Inc., Lowell, MA.

Ronald Rehkamp is now assistant actuary within the group actuarial organization at State Mutual. He has a master's degree in business management from the University of Arkansas.

Marshall Taylor, vice president and treasurer of Ryder Systems, Inc., was recently elected vice president of financial planning and will also continue as treasurer of the firm. Before joining the Miami-based company in 1974, he held management and financial posts with Allis-Chalmers and Mobil.

1969

BORN: to Mr. and Mrs. **Charles Kalauskas** their first child, Rebecca, on January 28, 1982.

Craig Barrows is a physics teacher at The Head-Royce School in Oakland, CA.

John Czajkowski holds the post of manager of advanced planning at Consumer Value Stores (CVS), a division of Melville Corp. in Woonsocket, RI.

Charles Forand is manager of New England Telephone, Boston. He resides in Southboro, MA.

James Heinrich is employed as district sales manager at Industrial Equipment Co., Calgary, Alberta, Canada.

Anthony Leketa is an area engineer for the Northeastern Area Office, NY District of the Corps of Engineers.

Charles Robinson, Jr., serves as manager of field application services for The Foxboro Company, Foxboro, MA.

1970

BORN: to Mr. and Mrs. **Leonard Polizzotto** twin daughters, Elizabeth and Kathryn, on December 26, 1981. Son Matthew has just turned four. Lenny has completed his PhD in visual sciences at Tufts University. Currently, he is vice president for technical operations at Briox Technologies, Worcester.

David Andre is employed as an actuary by the federal Social Security Administration in Woodlawn, MD.

Recently, **David Brown** joined AVCO Systems Division, Wilmington, MA, where he is manager of mechanical manufacturing engineering.

U.S. Representative **David Emery** of Rockland, ME, officially announced in January that he would run for the U.S. Senate this year.

Formerly with the Rochester, NH, Country Club, **Jack Gale** is currently the golf pro at Tatnuck Country Club, Worcester.

Stephen Johnson is now the program manager for fossil fuel utilization at Science Applications, Inc., Alliance, OH.

Alan Nizamoff, still with Exxon, is now a staff engineer in Florham Park, NJ.

Lloyd Palter works for Boston Edison in Boston. He resides in Sharon.

Marc Schweig is employed as department chief at Western Electric, Morristown, NJ.

Carl Swanson serves as engineering manager at Fenwal Incorporated in Ashland, MA.

Still with Rinker Portland Cement, **Michael Vardeman** is currently a general management engineer for the Miami-based firm.

1971

BORN: to Mr. and Mrs. **David Buelow** a daughter, Melissa, on December 1, 1981. Buelow is a hydraulic engineer for the Ohio River Division of the Army Corps of Engineers, Cincinnati. . . . To Judy and **Ed Lowe** their second child, Craig Barrett, on January 19, 1982. Daughter Beth is now three. . . . To Mr. and Mrs. **Anthony Monteiro** a second son, Adam Joseph, last June. Their older son, Matthew, is five. Tony is in the MBA program at WPI. . . . To Mr. and Mrs. **Albert Stromquist, Jr.**, their first child, Brian Derrick, on March 26, 1982 in Paris, France. Stromquist, a geologist and engineer, manages far eastern explorations for French International Oil.

Robert Anderson is a senior engineer at Velsicol Chemical, Beaumont, TX.

Michael Armenia holds the post of manager of contracts at Analysis & Technology, Inc., North Stonington, CT.

Barry Belanger continues as a systems design engineer for GE Medical Systems. He is located in Milwaukee.

Donald Johnson is serving on Gov. Hugh Gallen's Management Review Project in New Hampshire. The project's goal is to increase the efficiency and cost-effectiveness of state government. Johnson holds the post of industrial engineer-manager with Davidson Rubber Co. in Dover, NH.

Douglas Kullman serves as district traffic engineer for the State of Ohio Transportation Department. He is located in Newark, OH.

Currently, **John Lind** is the Tennessee division supply supervisor for General Telephone Co. S.E., Inc., Cookeville, TN. The company is a division of GTE Corporation.

Still with MTS Systems Corp., **John Moore, III**, is currently an application engineer-international. He is headquartered in Minneapolis.

Herbert Nock is sales manager for GE's medium steam turbine department in Lynn, MA.

Recently, **Donald Peterson** was named controller of Northern Telecom Limited in Toronto.

Paul Smith, president and chairman of the board of PRS Energy Industries, Inc., New York City, is listed in the 1982 edition of *Who's Who in Engineering*.

Joseph Spezeski works at Hughes Aircraft in Tucson, AZ.

David Winer holds the post of reliability manager at Orion Research in Cambridge, MA.

A. E. "Tony" Yankauskas was recently appointed director of finance and business planning for International Operations Development at Continental Can International Corporation, Stamford, CT.

1972

Reunion September 24–26, 1982

BORN: to Mr. and Mrs. **Raymond W. Coleman** their third child and first daughter, Meredith Ann, on March 7, 1981. Brothers Jeff and Greg are seven and three, respectively. . . . To Mr. and Mrs. **Mark Fritz** their first child, Heidi, on September 28, 1981. . . . To Renee and **James Hall, Jr.**, a second daughter, Ashley Brooke, on January 8, 1982. Jim continues with Norton Co. in Gainesville, GA. . . . to **Jeff** and **Mary Bollino Petry, '74**, their fourth child, Lisa Anne, on December 9, 1981. Jeff continues as district sales engineer for Torrington Bearings in Detroit, where he is also the coordinator for transmissions for all GM accounts.

This year **James Anderson** will receive his PhD from the University of Connecticut. He holds the post of securities analyst at Advest, Inc., Hartford, CT.

Gordon Chess is dean of the faculty of engineering science at the University of Western Ontario in Canada.

Andrew Glazier was recently chosen the 1982 Young Engineer of the Year by the joint committee of New Hampshire Engineering Societies. The award is based on leadership in professional and civil activities and contributions to the Society. In 1978 he joined the Perini Corporation, where he is a structural engineer at the Seabrook nuclear power plant.

Albert Heaney is a professor at California State University in Fresno.

Currently, **Stephen Joseph** holds the post of manager of New England Telephone, Boston.

Howard Levine works as a program engineer in the MOS Memory Division at Texas Instruments, Houston.

Formerly with Rath & Strong, **David Meyer** is now president of Micro Business Solutions, Inc., Foster City, CA.

Continuing with Spectra Physics, **John O'Brien** currently holds the post of operations manager. He is headquartered in Eugene, OR.

Brian Savilonis, assistant professor of mechanical engineering at WPI, has been named a 1982 Teetor Award recipient by the Society of Automotive Engineers for his technical work in the energy field. Last November he placed fourth in The National Athletic Congress 40-kilometer Racewalking Championship in New Jersey.

Robert Weir holds the position of president at Robert Weir & Co., Engineers, Boston.

1973

MARRIED: **Daniel H. Prior, III**, to Jane M. Andren on March 13, 1982 in East Lyme, CT. Mrs. Prior graduated from St. Mary's College and is a microbiologist for the West Roxbury Veterans Administration Hospital, Boston. He is a supervisor of work methods for New England Electric, Westboro, MA. . . . **J. Diane Pritchard** and Thomas Triggs on July 15, 1981. Mrs. Triggs is a programmer/analyst at Rhode Island Hospital Trust National Bank in Providence, RI. Her husband is the owner and president of J&D Fishing Corp., New Bedford, MA.

BORN: to Arlene and **Gene Franke** their first child, Laura Megan, on November 19, 1981. . . . To Luanne and **Richard Socha** their second child and first daughter, Andrea Jo, on September 10, 1981. Their son, Michael, is two.

William Ault continues as supervisor and product engineer at Norton Co., Worcester.

Richard Brontoli continues at graduate school at the University of Florida where he is studying for his MSCE in construction management. After receiving his degree, he will be assigned to a Corps of Engineers district office in the U.S. He is a captain in the Corps.

Thomas Dagostino works as engineering program manager at Tektronix, Inc., in Beaverton, OR.

Thomas Gargiulo serves as manager of engineering services at U.S. Waterproofing, Inc. He is located in Fairfield, CT.

Currently **David Hartwell** is assistant plant manager at L. M. Gill Welding & Mfg. Co., Manchester, CT.

Roger Heinen works as a consulting engineer for Digital, Bellevue, WA.

Ed Jamro, representing the New Jersey Chemical Industry Council, was recently appointed to the New Jersey Hazards Management Advisory Committee (HMAC). The HMAC is a joint state-industry committee which addresses problems caused by chemical spills and abandoned dumpsites.

Frank Kania is now a senior construction cost engineer at Stone & Webster and is located in Oak Ridge, TN.

Harry Kasparian serves as industry applications marketing manager for Analog Devices of Norwood, MA.

Joshua Kolawole, who has a PhD from RPI, serves as a staff scientist at McGraw Edison Co. He is located in Franksville, WI.

David Ligeikis is employed as a senior civil engineer in Binghamton, NY, where he is affiliated with the New York State Department of Transportation.

George Neill works as a senior sanitary engineer for the New Hampshire Water Supply & Pollution Control Commission. He is headquartered in Concord.

Dr. **Bill Penney**, assistant professor of biomedical engineering at WPI and a representative of the Physicians for Social Responsibility, discussed nuclear arms and power and the effect they could have on children, health and the future at a program presented by The Blackstone Valley Council for Children in Hopedale, MA, in March.

Roger Savery, Jr., recently received his MBA from Western New England College, Springfield, MA. He holds the post of sales manager at Datamarine International Inc., Pocasset.

Richard Stockdale is a diagnostic engineer at Digital in Marlboro, MA.

Robert Torbin is with Foster Miller, Inc., in Waltham, MA.

Michael Varga is engineering section administrator of quality assurance at The Barden Corp., Danbury, CT.

John Zikopoulos is manager of biomedical research at Polybac Corporation, Allentown, PA. He and Athena have two children and reside in South Whitehall.

1974

BORN: to Susan and **Stephen Braley** their first child, David Alan, on April 16, 1982. Braley is area supervisor at Hercules, Inc., Jefferson plant, near Pittsburgh. His wife is completing her master's degree in nursing at the University of Pittsburgh. . . . To **Jim** and **Lexy Chito Ferraris, '77**, a daughter, Angela Marie, on March 25, 1982. . . . To Paula and **John R. Mason, III**, their second child, Holly Victoria, in April of 1981. Currently John is a member of the technical staff at The Mitre Corporation, where he is working on thermal problems arising with electronic packaging for the U.S. Air Force.

Bruce Beaupre, who is working for his MBA at WPI, is still with the technical photo division of Polaroid Corp., Waltham, MA.

David Clew works as an energy utilization representative for Pacific Gas & Electric, San Jose, CA.

Now employed at GPU Nuclear Corp., **Arthur Dodd** is headquartered in Parsippany, NJ.

Robert Ferrari serves as a project engineer for Architectural & Engineering Service Corp., which is located in Decatur, IL.

Gary Golnik holds the post of senior project engineer at TRW Defense & Space Systems Group, Redondo Beach, CA.

Howard Greene serves as a senior associate engineer at IBM, a division of Federal Systems, in Manassas, VA.

Alan Judd is a senior manufacturing engineer for the Cleaver Brooks Division of Aqua Chem. He is located in Lebanon, PA.

Alan Kirby is advertising development manager of distributed systems at Digital Equipment Corp., Tewksbury, MA.

Continuing with Norton Co. in Worcester, **Jeffrey Lindberg** serves as a senior project engineer.

Ellen Church Peterson continues with AT&T, Piscataway, NJ, where she is a manager and systems analyst.

Hirant Rakijian holds the post of development engineer at Garrett Airesearch Mfg. Co., Torranee, CA.

Alice Ann Sayler has been granted tenure and promoted to associate professor of chemistry at Bloomfield College, Bloomfield, NJ.

Richard Ventre serves as area supervisor of production for du Pont in La Porte, TX.

1975

MARRIED: **Robert Fried** and Meryl Altabet on June 14, 1981. He now works for General Instrument Corp. on high power MOSFETs. . . . **Tim Hendrix** to Linda Savage of Eugene, OR, on March 6, 1982. The bride graduated from Northwestern College Institute of Fashion Merchandising. Tim serves as chief estimator and project and division manager for Wildish Land Co., Eugene. He has an MSCE from Stanford University. . . . **John E. Kelly** to Anne M. Flanagan in Kingston, NY, on December 5, 1981. Mrs. Kelly is head teacher at the Adolescent Day School of Community Treatment Complex, Inc., Worcester. She graduated from SUNY, Cortland, NY, and has her M.Ed. degree from Pennsylvania State University. John has a master's degree from Cornell and is a market gardener with Bob Kelly and Sons, Upton, MA.

BORN: to Betsy Ann and **Steven Coes** a son, Daniel, on February 19, 1982. . . . To Mr. and Mrs. **Steven Manzi** a daughter, Stephanie Joanne, on April 15, 1982. Manzi continues as a development engineer at Hewlett-Packard in Waltham, MA.

Raymond Acciardi is a research civil engineer for the U.S. Bureau of Reclamation, Denver.

J. Hunter Babcock is employed as a design engineer at Nova Robotics, Ltd., East Hartford, CT. He lives in Cromwell.

William Booth holds the post of patent attorney at Fish & Richardson in Boston.

Alan Chandler works as a project engineer at HNTB in Kansas City, MO.

Frederick Cordella holds the post of senior structural engineer at The Badger Co., Cambridge, MA.

In November **Mark Drown** started working as project engineer in the plant engineering department at The Torrington Company, Torrington, CT.

Kenneth Howell works as an account representative for Finance One and is headquartered in Rockville, CT.

Joseph Kwiatkowski is a graduate teaching assistant in the mathematics department at Syracuse University. He is studying for his PhD in mathematics.

Laurence Michaels is a self-employed system consultant with Michaels Enterprises, Plainsboro, NJ.

Karen Arbige O'Dea serves as a field systems manager, product support MIS, at Digital Equipment Corp., Maynard, MA. She and her husband reside in Wilmington.

Christine Powers holds the post of production supervisor at Baxter Travenol Lab., Inc., Round Lake, IL.

David Shopis has been appointed manager of project operations for the FIP Corp., Farmington, CT. With the firm since 1979, he has an MS in building science from RPI.

Donald Taddia works as a tenant engineer for the Dravo Tower, Pittsburgh, Pa. He is employed by Turner Construction Company.

1976

MARRIED: **Edward H. Floyd** to Cher Nelson in Charlestown, NH, on March 14, 1982. Mrs Floyd holds a BA from Lake Forest College and an MA from Western Michigan University. She is a college instructor and counselor. He serves as a project manager at Dufresne-Henry, North Springfield, VT. . . . **Peter B.**

Hallock and Donna White in Worcester on October 10, 1981. The bride is employed at Digital Equipment Corporation. Peter has been at Interactive Systems since it was founded nearly five years ago. . . . **Ray Houle** and Pat Barber on January 2, 1982. Ray, who is a manufacturing engineer at Trifari, is also studying for his MBA at Bryant College. . . . **Raymond J. Robey** and Debra J. Sorlin in Chelmsford, MA, on March 20, 1982. Mrs. Robey, a graduate of Bates College, is an analytical chemist for Air Products and Chemicals, Allentown, PA, where Ray is also employed. . . . **Edward A. Whittaker** and Suzanne Hetman in New York City on January 30, 1982. The bride, an associate engineer with ADAP Co., New York, received her BS from the City University of New York. The groom will receive his PhD in physics this year.

BORN: to **Peter DiPietro** and **Sandra Reardon DiPietro** a daughter, Amanda Marie, on February 24, 1982. Their older daughter, Stephanie, is three. The family lives in Nuttings Lake, MA. Pete continues with Industrial Risk Insurers in Wellesley, where he is a special representative.

Douglas Adams is employed as a systems analyst at Massachusetts Mutual Life Insurance, Springfield, MA. He lives in Agawam.

Mark Allyn serves as an applications engineer in Raytheon's Submarine Signal Division, Portsmouth, RI.

Lloyd Boyden, III, works for Newport News Shipbuilding-Tenneco, in Virginia.

Douglas Brown is a scientist at International Nickel Corp. in Suffern, NY. He resides in Dobbs Ferry.

Stephen Cummings is an R&D engineer at Lenox Machine Company, Inc. of Lenox, MA.

Still with Airco, **Bob D'Orazio** is currently a senior engineer at the Houston-based firm.

John Germaine continues as a graduate student at MIT.

Diane Gunn is a project engineer for the Mass. Port Authority, Logan International Airport, Boston.

Richard Isaacs is a senior engineer at Boeing Commercial Airplane Co., Seattle, WA.

William "B.J." Johnson was recently named group underwriting consultant in the Group Underwriting and Marketing Division of the Northeastern Home Office of The Prudential.

Kermit Kelley serves as manager of manufacturing and development engineering for the Bonded Abrasive Division of Ferro-Corp. He is located in Buffalo, NY.

Paul Landino holds the position of president at Zycron Systems, Inc., Orange, CT. He lives in New Haven.

Thomas Mandle holds the post of product design supervisor for Hewlett-Packard in Santa Clara, CA.

Ronald Medrzychowski has been promoted to assistant chief nuclear test engineer at Electric Boat-General Dynamics in Groton, CT.

James Roberge is concerned with corporate research and development at GE in Schenectady, NY. He holds a master's degree from the University of Rhode Island.

Karen Swanson is a graduate student in the department of geosciences at Penn State University, State College, PA.

1977

Reunion September 24–26, 1982

MARRIED: **Roger Lemos** and Mary Ashe in Lowell, MA, on April 17, 1982. The bride graduated from the University of Lowell and is employed by Wang Laboratories, Wethersfield, CT. Roger works for General Dynamics, Electric Boat Division, Groton. . . . **Steven R. Stafford** to Susan M. McFarland in Fitchburg, MA. The bride graduated from the University of Massachusetts, Boston. She is a chemist with E.S.A. Laboratories, Inc., Bedford. Steve is an electrical engineer employed in Boston.

BORN: to **Mary Hainsworth Hickey** and her husband, Robert, a son, John Paul, on December 30, 1981. Mrs. Hickey is a development engineer in ARCO Chemical Company's Research Planning and Evaluation Group, Newtown Square, PA. He is a project officer for the Economic Development Administration.

Mike Abrams has been promoted to product development engineer by Geosource, Houston, TX. He continues studying for his MSEE at the University of Houston, his primary area being digital signal/image processing.

Michael Bloom serves as a systems programmer at Blue Cross in Boston. He is studying for his private pilot's license.

Alfred Elvin is now an assistant professor of pharmacy at the University of Illinois College of Pharmacy, Chicago.

Steven Fine was recently promoted to applied scientist at the Western Company of North America.

Domenico Grasso continues with the U.S. Army Environmental Hygiene Agency in Atlanta, GA. He has been appointed a member of the Standing Committee on Disinfection and also serves as the secretary of the Task Force on Effluent Disinfection of the Water Pollution Control Federation, Washington, DC.

Hilding Holroyd works as a senior systems analyst at Perkin-Elmer Corp., Oceanport, NJ.

Ronald Jolda, who holds degrees from UMass and WPI, is now a medical student at New England College of Osteopathic Medicine, Biddeford, ME.

Dennis Legnard holds the post of service manager at Aworthy Bicycle Co., a subsidiary of Schwinn Bicycle Co., Waltham, MA.

Robert Medeiros holds the post of district supervisor at Industrial Risk Insurers. Currently, he is headquartered at Hitchin, Herts, England.

In May **John Osowski** received his MBA from Rochester Institute of Technology.

Herbert Schiller is employed as a process engineer at Foremost Mfg. Company in Union, NJ.

Donald Statile now works for the Arizona Public Service Company in Phoenix.

Robert Ware continues as a graduate student in the department of chemical engineering at MIT. He holds an MS from Cornell University.

Paul Wittman has joined Fairchild Republic Company, Farmingdale, NY.

1978

MARRIED: **Paul R. Cody** and **Lisa A. Moore, '80**, in Boston recently. The bride is with Stone Webster, Boston. Paul works for Westinghouse. . . . **James A. Fisher** and Sharon Ann Ganges in Vernon, CT, on February 20, 1982. The bride attended Manchester Community College and is employed by Hamilton Test Systems, Tucson, AZ. Jim also works for Hamilton Test Systems. . . . **Ernest Poulias** to Sharon Anne Scully in Wolcott, CT, on January 30, 1982. Mrs. Poulias has a JD from Oklahoma City University School of Law. Ernest is employed by Combustion Engineering of East Windsor, CT.

BORN: to Mr. and Mrs. **Stephen Kuczarski** their second child, Michael, on November 13, 1981. . . . To **Leonard** and **Elizabeth Papandrea Lariviere, '76**, their second daughter, Rebecca Leigh, on February 12, 1982. Their older daughter, Christina, is three. Len serves as a planning engineer (structural design of microwave radio towers) for Western Electric in North Andover, MA.

Michael Ahern serves as an associate engineer at Northeast Utilities, Hartford, CT.

Ian Cannon holds the post of lead engineer for advanced solar receivers at the Rockwell Rocketdyne Division in Canoga Park, CA.

Robert Cook is now a development engineer at Tandem Computers, Inc. in Sunnyvale, CA.

Edward Freniere is a senior development engineer at Honeywell, Inc. He is headquartered in Lexington, MA.

Kathryn Lyga Heselbarth works as a project engineer at CE-KSB Pump Co., a subsidiary of Combustion Engineering in Newington, NH.

Austin Kalb is a member of the technical staff at Rockwell International, Autonetics Division, Advanced Optics Group in Anaheim, CA.

Kenneth Kummins serves as a senior engi-

neer at E.D.S. Nuclear, a subsidiary of Impell Corp., San Francisco.

Ethan Luce is employed as a design analysis engineer at Sikorsky Aircraft, Stratford, CT.

Brian McLane works as a design engineer at Lexidata Corporation in Billerica, MA.

Jennifer Pollard is an assistant civil engineer for the New York State Dept. of Transportation.

Stephen Superson is a design engineer for Teledyne Engineering Services, Waltham, MA.

Gary Sylvestre serves as a project manager at Barclay's American Business Credit, Inc., East Hartford, CT.

Jeffrey Wakefield is product manager at Data Terminal Systems, Maynard, MA.

1979

MARRIED: **Gary Doyle** and Janet Stark last September. Both are senior associate engineers at IBM in Essex Junction, VT. . . . **Earl B. Ingham** and Cheryl L. Nugent on January 9, 1982 in Granby, MA. The bride, an ophthalmic technician for Dr. Robert Donohue, graduated from Holyoke Community College. Earl is employed by Aetna Life and Casualty Co., Springfield, MA. . . . **George R. Tompsett, III**, and Carla Ann Ranney in Broad Brook, CT, on April 24, 1982. Mrs. Tompsett graduated from Windsor Locks High School and is an operations clerk for Hamilton Standard Division of United Technologies, Windsor Locks, CT. George is a process and methods engineer at Hamilton Standard.

BORN: to Andrea and **William R. Herman** a son, Bryan William, on March 31, 1981. Herman is now a senior staff member at Arthur Andersen Company, Hartford, CT.

Jeff Boike continues as a manufacturing process engineer at UOP in McCook, IL. He and his wife, Mary Lynn, reside in Hinsdale.

Glenn Braunstein holds the post of development engineer at Goodyear Tire & Rubber Co., Akron, OH.

John Donahue is employed as an electric studies engineer at Niagara Mohawk Power Company, Syracuse, NY.

Donna Graves is systems marketing manager at Digital Equipment Corp., Merrimack, NH.

Bruce Jenket, who was promoted to lt.j.g. last November, has returned from deployment in which he visited Japan, Guam, Hong Kong and the Philippines. Currently he is an assistant in the Reactor Controls Division of the U.S. Navy, stationed at Pearl Harbor.

Donald Larson works as a product marketing specialist at GCA Corporation. He is located in Bedford, MA.

Jeff Mills designs oil refineries for UOP, Inc. He resides near Chicago.

Gary Pearson serves as New England sales representative for Priam Corporation of Needham, MA.

Ronald Roth is employed as a product engineer at Honeywell in Lexington, MA.

Lt. **Jason Tuell** serves as a numerical prediction meteorologist for the USAF at Offutt AFB, NE.

George Wespi continues as an associate engineer at Riley Stoker Corp., Worcester.

Priscilla Young is studying for her master's degree in environmental engineering at Cornell University.

1980

MARRIED: **Robert W. Dreyfoos** and Martine B. Vray in Worcester on September 26, 1981. Mrs. Dreyfoos, a graduate of Worcester State College, is an inspector for the Palm Beach (FL) County Health Department. He is a design engineer for Photo Electronics Corp., West Palm Beach.

Mihran Aroian is a research technician at WPI.

Theodore Crowley holds the post of manager of language products at C.S.P. Inc., Billerica, MA.

David Fox works as a software engineer at Digital Equipment Corp., Merrimack, NH.

Currently, **Richard Goldman** is a student at the University of Connecticut School of Law in West Hartford.

Michael Herberg continues with GE in Schenectady. Earlier he had been assigned to the Waterford plant.

Arthur Huggard, process engineer at Monsanto Plastics & Resins, Springfield, MA, recently received the Monsanto Employee Achievement Award.

Stephen Kmiotek is a chemical engineer at Cabot Corp. He is located in Billerica, MA.

Kenneth Mandile holds the position of vice president at J.B.M. Swiss Screw Co., Inc., Waltham, MA.

John Roche, still with Micro Networks, is now thin-film engineering supervisor at the Worcester firm.

Doreen Savieira holds the post of planning engineer at Western Electric Co., North Andover, MA.

Jeffrey Smits continues as a member of the technical staff at Bell Labs in Holmdel, NJ.

Mike Stone continues as associate editor of **Car & Driver's Buyers Guide** and **Cars** magazine. He is also vice president of TMS Computer Services and the author of two books: **Mopedaller's Handy Manual** and **Your Four**, a guide to four-cylinder motorcycles. The Stones reside in Danbury, CT.

David Sulkin serves as a design engineer at Hamilton Standard, Windsor Locks, CT.

James Torrey, Jr., serves as a maintainability engineer at Digital Equipment Corp., Marlboro, MA.

Marianne Wessling continues as a doctoral candidate in the department of biophysics and theoretical biology at the University of Chicago.

Lisa Wylie is a staff member at Western Electric Co., North Andover, MA.

1981

MARRIED: **Richard F. Condon, Jr.**, and Linda J. Michaud in Townsend, MA, on April 24, 1982. Rich is a photographic engineer at Kodak, Rochester, NY. . . . **David R. Lamborghini** to Helen Aadland in Fairhaven, MA, on January 9, 1982. Mrs. Lamborghini graduated from Fairhaven High School. David is with Procter & Gamble, Quincy. . . . **Steven M. McDonald** and Pamela J. Loftus on January 16, 1982 in Worcester. The bride is a student at Becker Junior College. Steve is with Data General in Westboro. . . . **Joseph P. Norman, III**, and Susan A. Bish in Springfield, MA, on December 27, 1981. The bride has an AS degree in medical assisting from Becker Junior College. Joe is a structural engineer at McDermott, Inc., New Orleans, LA. . . . **Scott A. Sargis** and Karen L. Richardson in Leominster, MA, on February 5, 1982. Mrs. Sargis graduated from Becker. Scott is a mechanical engineer with Chevron Chemical Corp. in New Orleans.

Anthony Cabral is a student at Carnegie-Mellon University, Pittsburgh, PA.

Cindy Canistro works as a project engineer at GE Plastics in Pittsfield, MA.

James Connor is a sales engineer for Advanced Micro Devices in Sunnyvale, CA.

Dan Doherty, Jr., works as a senior technical marketing specialist at Digital Equipment Corp., Marlboro, MA.

Ethan Foster holds the post of programmer/analyst at the Laboratory of Computer Science, Massachusetts General Hospital, Boston.

Currently, **James Geib** is a design engineer at Winchester Electronics. He is located in Watertown, CT.

Robert Hess has joined the Methods/Facilities Branch in the Production Department, Department of the Navy, Norfolk Naval Shipyard, Portsmouth, VA.

Peter Hinckley has been employed as a product engineer at The Torrington Company, Torrington, CT.

Keith Mazzarese works as a field engineer for Stone & Webster in Waterford, CT.

William Miller holds the post of sales engineer at Westinghouse Electric in Framingham, MA.

David Oriol is now an associate at Manufacturer's Business Systems, Inc., Worcester.

Frank Polito is part of the technical staff assigned to the digital lines department at Bell Laboratories, North Andover, MA.

Timothy Shea works as a scheduling engineer for Crawford & Russell, Inc., of Stamford, CT.

Jeffrey Smith is a planning and systems analyst-manager at Dresser Atlas in Houston, TX.

Peter Tiziani is a design engineer for Combustion Engineering in Windsor, CT.

David Valardi serves as a field engineer at Dresser Atlas in Rayne, LA.

Robert Wright holds the post of assistant engineer at New England Power Service Company in Worcester.

School of Industrial Management

Clifford Pontbriand, '58, continues as manager of frame operations at Pennsylvania Optical Co., Reading, PA. . . . **William Barlow, '65**, has been elected executive vice president at Wyman-Gordon in Worcester. He joined the company in 1943 and has worked in engineering, manufacturing and senior management jobs. . . . **Leo St. Denis, '65**, has been promoted to manager of quality control at Anderson Operations-Bay State Abrasives Division, Worcester. He has an associate's degree in mechanical engineering from Worcester Junior College. . . . **Ernest Anger, Jr., '78**, has been appointed manager of system development at Bay State Abrasives Division, Dresser Industries, Westboro, MA. He graduated from Wentworth Institute and joined Bay State in 1958 as an engineering technician.

Natural Science Program

In January Worcester State College physics professor **Robert Kelley, '60**, courtesy of the U.S. Navy, joined 36 college instructors from all over the country at Cape Canaveral to get a firsthand look at the "new nuclear Navy." One of the highlights of the visit was an opportunity to witness a simulated missile launch from a nuclear-powered submarine. . . . **Ralph Southwick, '66**, teaches science at Jefferson (MA) Middle School. . . . **Philip Wilson, '78**, continues teaching at Lynnfield High School, Lynnfield, MA. . . . **William Johnson, Jr., '81**, is a teacher at Rockport High School, Rockport, MA.

COMPLETED CAREERS

David E. Carpenter, '11, of Agawam, MA, a long-time employee of Westinghouse, died on April 1, 1982 at the age of 93.

Except for four years with Buckeye Products, Mr. Carpenter was with Westinghouse Electric Corp. from 1911 until his retirement. He earned the company's highest honor, the Silver "W" Order of Merit, and held a patent on a winding machine to automate the winding of motor stators and rotors. In 1955 he retired as a consulting manufacturing engineer.

A. Hugh Reid, '11, of Worcester, class vice president, passed away recently.

He was born on July 7, 1889 in Worcester. Graduated from WPI as a mechanical engineer, he was retired from CF&I Steel Corp. and belonged to the Tech Old Timers and Sigma Xi.

Alfred R. Kinney, '12, of Blacksburg, VA, a long-time employee of the U.S. Forest Service, died February 3, 1982. He was 92.

A Worcester native, he received a BSCE from WPI. During his career with the U.S. Forest Service, he served as examiner of surveys in West Virginia, Virginia and Pennsylvania and as chief land examiner in the Unaka and Pisgah National Forests situated in Virginia, Tennessee and North Carolina.

Roland H. Dufault, '14, of Wellesley Hills, MA, president of the Class of 1914, died on January 31, 1982.

"Mike" graduated with his BS in chemistry from WPI, then worked for three years at J. Russel Marble & Co., Worcester. During World War I he was a major in the U.S. Army. From 1919 until 1953 when he retired as branch manager in New York City, he was with du Pont.

He had been a member of the New York Board of Trade, the Chemists Club of New York, Tau Beta Pi and Sigma Xi. A native of Spencer, MA, he was 89. He was a former WPI Alumni Council representative from Philadelphia and a member of the Tech Old Timers.

William J. Becker, Jr., '15, of Kansas City, MO, passed away recently. He was 89.

During his career, he was employed by Butterworth Judson, Midwest Refining Co., General Engineering and Maintenance Corp. and Trojan Engineering Corp. From 1932 until he retired in 1957, he was with Long Island Lighting Co., where he rose to superintendent.

Mr. Becker, a Mason, was also a past president of his local Rotary Club. For 15 years he was active with the BSA, advancing to district director. He belonged to Theta Chi and was a World War I Army veteran.

Simon Collier, '16, a retired executive from Johns-Manville Corporation and resident of Los Angeles, passed away in December.

Following his graduation as a chemist from WPI, he joined the Boston Belting Company. Later employers were the National Bureau of Standards, Washington, DC, Johns-Manville, from which he retired as director of quality control in 1959, and UCLA, where he was an associate professor-lecturer. A nationally known authority in the field of industrial quality control, he specialized in quality control consulting in asbestos fiber and products. Papers on his specialty were published in various professional magazines.

Mr. Collier was born on June 1, 1894 in Salem, MA.

Edwin W. Bemis, '19, of Brick Town, NJ, died recently.

After graduating as an electrical engineer, he did part-time graduate work at WPI. From 1920 to 1962 he was on the headquarters staff at American Telephone & Telegraph Co. He joined ITT in 1962 and retired in 1968.

Mr. Bemis was born July 19, 1897 in Holyoke, MA. He was a senior member of IEEE and belonged to Tau Beta Pi and Sigma Xi. He served as secretary of the Class of 1919. He was a former secretary of the New York Chapter of the WPI Alumni Association.

Roy H. Carpenter, '19, of Wooster, OH, died on July 4, 1981.

He was born on September 11, 1897 in Warren, MA, and graduated with a BS in chemistry. In 1929 he received his MA from Columbia University.

After teaching in several high schools in Maryland, Massachusetts and Connecticut, he taught at Ossining (NY) High School from 1929 to 1945. From 1945 to 1964, when he retired, he was principal at Roosevelt School in Ossining. Mr. Carpenter belonged to the Masons and to the Ossining Board of Education.

Dana D. Goodwin, '19, of Fitchburg, MA, the retired president of W. C. Goodwin, Inc., died April 17, 1982.

A Fitchburg native, he was born on October 5, 1897 and later studied electrical engineering at WPI. During his career, he was affiliated with the Rock Island (IL) Arsenal and Simonds Mfg. Co. For many years he was the self-employed president of W. C. Goodwin, Inc., a retail shoe store in Fitchburg.

Mr. Goodwin belonged to Phi Sigma Kappa and the Masons. He was a former vice president of the Worcester County Alumni Club of the WPI Alumni Association.

Arthur W. Bassett, '20, of Lititz, PA, passed away on January 29, 1982.

In 1962 he retired as chief of power engineering at Armstrong World Industries, where he had been employed since 1929. Previously, he was with Pennsylvania Power and Light Co. and New Jersey Zinc Co.

He was born on January 4, 1897 in Heath, MA, and received a BSME from WPI. He belonged to the Masons, the Shrine, the National Association of Professional Engineers and Sigma Phi Epsilon. Formerly he served as president of the local chapter of the American Business Club.

David W. Dimmock, '22, died Christmas Day at his home in Hatchville, MA, following a long illness. He was 80.

Before retiring in 1959, he taught mathematics in the Falmouth school system for 15 years. For 40 years he operated a farm in Hatchville. He was born on February 21, 1901 in Pocasset, MA.

Austin J. Ball, '25, died March 9, 1982 in Hackettstown, NJ, at the age of 78.

A native of Clinton, MA, he was born on May 28, 1903. In 1925 he graduated as an electrical engineer from WPI. For many years he was employed by Consolidated Edison of New York City. He retired in 1975.

John J. McAuliffe, '25, of Walnut Creek, CA, passed away recently.

A native of Massachusetts, he was born on January 31, 1903. He graduated from WPI as an electrical engineer. For a number of years he was with General Electric in Schenectady, NY, and Westinghouse in Sunnyvale, CA. At his retirement he was an operations analyst at Stanford Research Institute in Menlo Park. He belonged to ATO and Skull.

Theodore D. Schoonmaker, '26, of Northboro, MA, a retired sales manager for Massachusetts Electric Co., died on February 16, 1982 in Marlboro Hospital. He was 79.

Following his graduation as an electrical engineer, he joined Malden Electric Co. From 1940 to 1944 he was an appraisal engineer for the North Central District of the New England Electric System. Later he was associated with the power sales department and then became commercial sales manager. He retired from Massachusetts Electric in 1967.

Mr. Schoonmaker was a member of the Masons, Trinity Church (former deacon) and the Tech Old Timers. He had served on the Municipal Code and Bylaw Committee of Northboro. He was the father of **Paul Schoonmaker, '56**, and was born on February 18, 1902 in Hyde Park, MA.

Albert A. Baron, '30, a retired manager for U.S. Envelope Co., died on March 16, 1982 at his home in Alhambra, CA.

He joined the Kellogg Division of U.S. Envelope in 1929 and was made plant manager in Springfield, MA, when the plant had over 1000 employees. He also was plant manager in Atlanta, GA, and Worcester and had been production control manager for the firm in Los Angeles, as well as western region sales representative.

Mr. Baron, a member of AEPi, was born March 10, 1907 in Bristol, RI. He received his

BSME from WPI. He belonged to the Masons and the Scottish Rites Bodies and was a former president of the Connecticut Valley Chapter of the WPI Alumni Association.

F. Gardner Davis, '30, died following a lengthy illness in San Jose, CA, on December 15, 1981. He was 75.

During his long career with General Electric, he served the company in Schenectady, NY, Chicago, IL, and in San Jose, CA, where he was a sales representative. He also worked for a local hospital as an X-ray electrician. He was a member of Phi Sigma Kappa.

Mr. Davis was born in Greenfield, MA. He graduated from WPI with a BSEE.

Thomas F. Flynn, '30, a former engineer with American Telephone & Telegraph Co., died March 4, 1982 in Holden (MA) District Hospital. He was 75.

Mr. Flynn retired in 1970 after serving AT&T's eastern and northeastern regions for 40 years. From 1956 to 1970 he was a staff supervisor and senior engineer in Wayne, PA.

For many years Mr. Flynn served on the WPI Alumni Council and was associated with the Alumni Fund, the former Techni-Forum program and the Committee on Students. He was a past president of the Philadelphia Chapter of the WPI Alumni Association.

Leonard G. Dunn, '31, former sales manager for Bedard-Gerard, Ltd., Montreal, Canada, died on July 30, 1981.

A native of Granby, Quebec, Canada, he was born on January 24, 1909. Following his graduation with a BSEE from WPI, he joined Canadian Westinghouse. Later he was with Canadian General Electric, Union Electric Supply and Century Electric, which he served as president. He held the post of sales manager at Bedard-Gerard and was a member of PKT and the Corporation of Professional Engineers.

Paul H. Fittz, '31, a retired plant engineer for Sears Roebuck Co. and a resident of New Salem, MA, died on January 25, 1982 at the age of 73.

He was employed by Sears for 28 years in Boston and Philadelphia. In 1965 he retired as plant engineer at the Philadelphia mail order plant. Previously he was with Natick Box and Board and Warren Machine Co.

On active duty with the Navy in World War II, he served during the invasion of Guadalcanal and in 1945 was stationed at Pearl Harbor. He returned to reserve duty as a captain in 1946. He was a past president of the Reserve Officers Association of Massachusetts.

For ten years he was vice president of the Orange (MA) Savings Bank, and had been president of the Kiwanis Club, former chairman of the New Salem Planning Board and a United Way volunteer. He and his wife taught round dancing, with Mr. Fittz advancing to president of the Western New England Round Dance Teachers Association.

A. Francis Townsend, '31, a retired vice president for Heald Machine Co., Worcester, died January 27, 1982 in Cape Cod Hospital, Hyannis, MA. He was 72.

With Heald for many years, he had served the firm as head of the grinding machine division, as chief company engineer and as a member of the board of directors. He was retired from Persons-Majestic Mfg. Co.

Graduating from WPI as a mechanical engineer, he belonged to Phi Gamma Delta, Tau Beta Pi, Sigma Xi, Skull, PTS and the Poly Club. From 1931 to 1935 he was an instructor in mechanical engineering and business at WPI. He served on his 50th Reunion Gift Committee, was a former member of the WPI Alumni Council and belonged to the President's Advisory Council. The vice president of the Class of 1931, he had also been president of the Alumni Association from 1958 to 1960.

Robert T. Goffin, '33, a retired projects engineer for Perkin-Elmer Corp., Norwalk, CT, died on February 3, 1982, at the age of 71.

He belonged to SAE, the Knights of Columbus, Kiwanis, the Society of Automotive Engineers and the American Society of Tool Engineers.

During his career he was employed by the Marine Biological Laboratory in Woods Hole, at American Optical Company, Buffalo, NY, and at Sperry Gyroscope, Great Neck, NY. In 1976 he retired from Perkin-Elmer following 18 years of service.

Tadeus J. Medowski, '34, died in Framingham, MA, on February 13, 1982, at age 70.

During World War II he joined a naval construction battalion. He served overseas and was later stationed at the Martha's Vineyard N.A.A.F. before being transferred to other bases.

James K. Healy, '35, of Newburyport, MA, passed away recently.

He was born on April 22, 1912 in Brookline, MA. For many years he was with Liberty Mutual, which he served as fleet engineer for the New England division. After his retirement, he became president of Newburyport Maritime Society, Inc., and the Custom House Maritime Museum.

Mr. Healy belonged to Phi Gamma Delta, the American Society of Safety Engineers and the Massachusetts Society of Professional Engineers. He had served as a director of the YMCA and as a lt. col. in the U.S. Army Reserve. In World War II he was with the U.S. Army Transportation Corps and received several service ribbons. Besides WPI, he attended MIT and Columbia University.

J. James Tasillo, '35, an engineer for Rudel Machinery Co., Newton Lower Falls, MA, died on January 24, 1982. He was 68 years old.

Prior to joining Rudel, which he served as a sales office manager, he had been with Pratt & Whitney, New England Machine & Tool Co., Hartford Special Machinery & Tool Co. and Taylor & Fenn Co.

He belonged to ASME, ASTE and Sigma Alpha Epsilon. He was a past president of the Hartford (CT) Chapter of the WPI Alumni Association, as well as a member of the Simsbury Industrial Development Commission.

Mr. Tasillo was born on September 20, 1913 in Hartford. He was the father of **J. James Tasillo, Jr., '64**.

Harold N. Pierson, '36, a long-time insurance executive, died March 10, 1982 at his home in Avon, CT.

He graduated from WPI as a civil engineer. In 1963 he joined Travelers Insurance Co., Hartford, from which he retired as director of the property-casualty division in 1977. Earlier he had been an executive assistant with Factory Insurance Association and assistant vice president of the former Springfield Fire & Marine Insurance Co. He had also served as assistant secretary of the Phoenix of Hartford Insurance Companies.

Mr. Pierson belonged to Phi Sigma Kappa. Active with the Episcopal Church, he served as a vestryman and as treasurer of the local church building fund.

Frank H. Jenkins, '38, died suddenly at his home in Garden City, KS, on February 27, 1982. He was 66.

At the time of his death, he was on the staff of United Engineers & Constructors, Inc., general contractor for a 280-megawatt power plant in process of construction near Holcomb, KS, for Sunflower Electric Cooperative. A registered professional engineer, his business career included assignments with Buffalo Forge Company, New York State, and Phillips, Getschow Co. of Chicago. Azco Engineering, Inc., Appleton, WI, which he helped to found, grew to become a major factor in construction activity in its area and is now one of the 50 largest mechanical contracting firms in the country.

George F. Boynton, III, '40, a long-time employee of Aetna Life & Casualty Co., died in March in New Haven, CT. He was 64 years old.

At the time of his death, Mr. Boynton was a supervising engineer at Aetna, Hartford, CT, where he had worked for 35 years. A Navy pilot in World War II, he served in the South Pacific. He belonged to ATO and the Masons.

Raymond L. Milner, '40, died in Charleston, SC, on February 26, 1982 following a brief illness. He was 63 years old.

He was employed at Grumman Corp., Bethpage, NY, before retiring in 1980. Previously, he served 20 years in the Navy Air Corps, retiring with the rank of commander.

A native of Rochdale, MA, he was active with the Episcopal Church.

Sylvan A. Genthner, '41, a retired tool and diemaker from Ludlow, MA, died February 23, 1982 at the age of 63 following a long illness.

"Sam," who was very active with the Shrine and the Eastern Star, was known as "Buttercup the Clown" in the Springfield Shrine's clown unit. He belonged to the Rainbow Girls' advisory committee and he was a former Boy Scout and 4-H Club leader. He was affiliated with several Masonic lodges and with the Scottish Rites Bodies and the Congregational Church.

Born in Warren, MA, he was a retired tool and diemaker for National Blank Book Co., Holyoke. Previously he had been with Westinghouse, Pratt & Whitney Aircraft and Warren Steam Pump.

Frank E. Schenk, '46, a retired engineer from The Torrington Co., Torrington, CT, passed away recently.

During his career, he was with J. Sklar Mfg. Co., Arma Corp., Hendey Machine Co. and Holtzer-Cabot. In 1956 he joined The Tor-

rington Co., which he served as chief project and methods engineer.

A native of Brooklyn, NY, he was born on March 3, 1919. He was a member of the ASME and the ASM, as well as a past president of his local Lions Club. He was active with the Elks and the Boy Scouts. In World War II he was an officer with the U.S. Navy.

Neil H. Gebhardt, '48, died last year in Japan while on assignment for his company, Aero Service Corp. of Litton Industries.

He was born on July 4, 1927, in Erie, PA. His employers included M&BM Mutual Insurance Co. and Gebhardt Coal Co., which he served as a branch manager, as well as Aero Service Corp.

Besides being active with the Big Brothers Association, he belonged to AIIE and the American Society of Photogrammetry. He graduated from Lehigh University.

Robert J. Campbell, '50, died in Louisville, KY, on February 28, 1982 following a long illness. He was 54 years old.

Born in Medford, MA, he received his BSME from WPI. During his career he was with Lapointe Machine Tool and Economic Machinery of Worcester and Sperry Gyroscope Co., Great Neck, Long Island, NY. He had served as vice president and general manager of Machinery Service, Inc., Louisville. He belonged to the ASME and Phi Sigma Kappa.

H. Stuart Dodge, '51, La Canada, CA, passed away on October 10, 1981.

During his career he was associated with Philco, Bell Telephone Co., Burroughs Corp., Analog Technology Corp., General Electric and the Jet Propulsion Laboratory in Pasadena. He received his BSEE from WPI and his MSEE from the University of Pennsylvania, subsequently being named an adjunct professor in the Electrical Engineering Department of Drexel University in Philadelphia.

Mr. Dodge was born on June 24, 1925 in New York City. He was active with the Boy Scouts.

Joseph E. Thomas, '51, of Norwalk, CT, died recently.

He was born on May 28, 1927 in Worcester and received his BSEE from WPI. Following graduation he joined Philco Corp., where he was employed until 1966. Later he became a director of engineering resources for GTE Sylvania, Stamford, CT.

A member of Lambda Chi Alpha and Eta Kappa Nu, Mr. Thomas also belonged to Sigma Xi.

Stuart R. Hathaway, '52, a production manager for American Cyanamid and a resident of Lincroft, NJ, died recently.

After graduating from WPI, he joined Olin Mathieson. Later he was with Wasco Chemical Co., acquired by American Cyanamid.

A former head agent for his class, he also belonged to SPE and the AIChE. He had worked locally for the United Fund, was a director of the Sanford Savings and Loan, was a town meeting member and a member of the warrant committee.

Mr. Hathaway, who was born on April 9, 1929 in Springfield, MA, was an active member of the men's club at his church.

Paul A. Wagenknecht, '54, of Gilbertsville, KY, died of a heart attack on New Year's Day.

A native of Adams, MA, he was born on September 19, 1932. Following graduation he joined A.P. Wagenknecht Co., Thompsonville, CT. Later he was employed at Rice Barton Corp., Worcester, as senior product engineer. In 1972 he was named engineering superintendent at Westvaco Corporation's fine papers mill at Wickliffe, KY. At the time of his death he was manager of corporate engineering at Inland Container Corp., Indianapolis, IN.

Mr. Wagenknecht belonged to Sigma Phi Epsilon, the ASME, the Masons, the Shrine and had been a member of the board of directors of his local Chamber of Commerce.

Dr. **William D. Johnson, SIM'55**, of Madison, WI, passed away on January 16, 1982.

He received his bachelor's degree from the University of Minnesota in 1939 and his MS and PhD from Lehigh University. Later he graduated from the School of Industrial Management at WPI.

The owner of Wm. Johnson Leather Co., Madison, he had previously worked for Dexter Leather Co., Bjorksten Lab., Graton & Knight, Howes Leather Co., the U.S. Dept. of Agriculture and the Government Printing Office in Washington, DC. He belonged to the American Chemical Society, the American Leather Chemists Association and the Fellowship of Christian Athletes in Wisconsin.

Dr. Johnson served as a chemical consultant for Middlesboro Tanning Co. and for the Kentucky State Board.

Henry W. Davis, SIM'64, died at his home in West Boylston, MA, on March 9, 1982. He was 69.

A 34-year employee of Norton Co., "Hank" retired in 1974 as superintendent of the abrasives division. For 27 years he served as commissioner and treasurer of the West Boylston Water District. He belonged to the Norton 25-Year Club, the Norco Club and was an officer of the Norton credit union. A member of Our Lady of Good Counsel parish, he also was affiliated with the Worcester County Horticultural Society, the American Legion, West Boylston Civic Club and the Lions Club.

Edward S. Hughes, SIM'69, a long-time employee of Heald Machine, died at the home of his sister in Taunton, MA, on January 23, 1982. He was 68 years old.

In 1978 he retired from Heald Machine Co., Cincinnati-Milacron, Worcester, after 37 years. He had been general shop superintendent since 1968. Previously he was associated with assembly and testing, parts manufacturing and sales and service.

Born in Bridgeport, CT, he belonged to the Episcopal Church and the Masons.

Geoffrey R. P. Gerhard, '73, of Farmington, NM, died recently.

Born on March 23, 1949 in New York City, he graduated with a BSEE from WPI. He was president of West Wind Co. in Farmington.

Roger S. Teagle, '73, died on January 4, 1982 at St. Joseph Hospital, Stamford, CT.

A Stamford native, he was born on April 15, 1951. He received his MSCE from the University of Michigan and his MBA from Boston College. He was employed by Optimum Resources Utilization Group, New York City.

Rosemary J. Wojtowicz, '80, died in Allentown, PA, on March 3, 1982 following a two-car accident.

She was born on October 4, 1958 in Palmer, MA. After graduating from WPI, she earned her master's degree at MIT. In February she began a new job as a chemical engineer at Air Products & Chemical Co. in Allentown.

Miss Wojtowicz belonged to the AIChE, SWE, Tau Beta Pi and the Chemical Honor Society.

WPI Homecoming Weekend 1982

September 24-26

Schedule of Events

Friday Evening

Concert

Saturday

General Registration
Alumni Crew Race
Fraternity & Dormitory Displays
Soccer: WPI vs Coast Guard
Fund Volunteer's Party
Reunion Class Brunches
(1967, 1972, 1977)
Skull Reception
Barbeque Luncheon
Women's Field Hockey:
WPI vs Framington State
Football:
WPI vs Coast Guard
Frank Sanella Road Race
Poly Club Reception
Reunion Reception
Rope Pull
Happy Hours
Octoberfest Dinner
Nightclub Entertainment
Fraternity Dinners and Parties

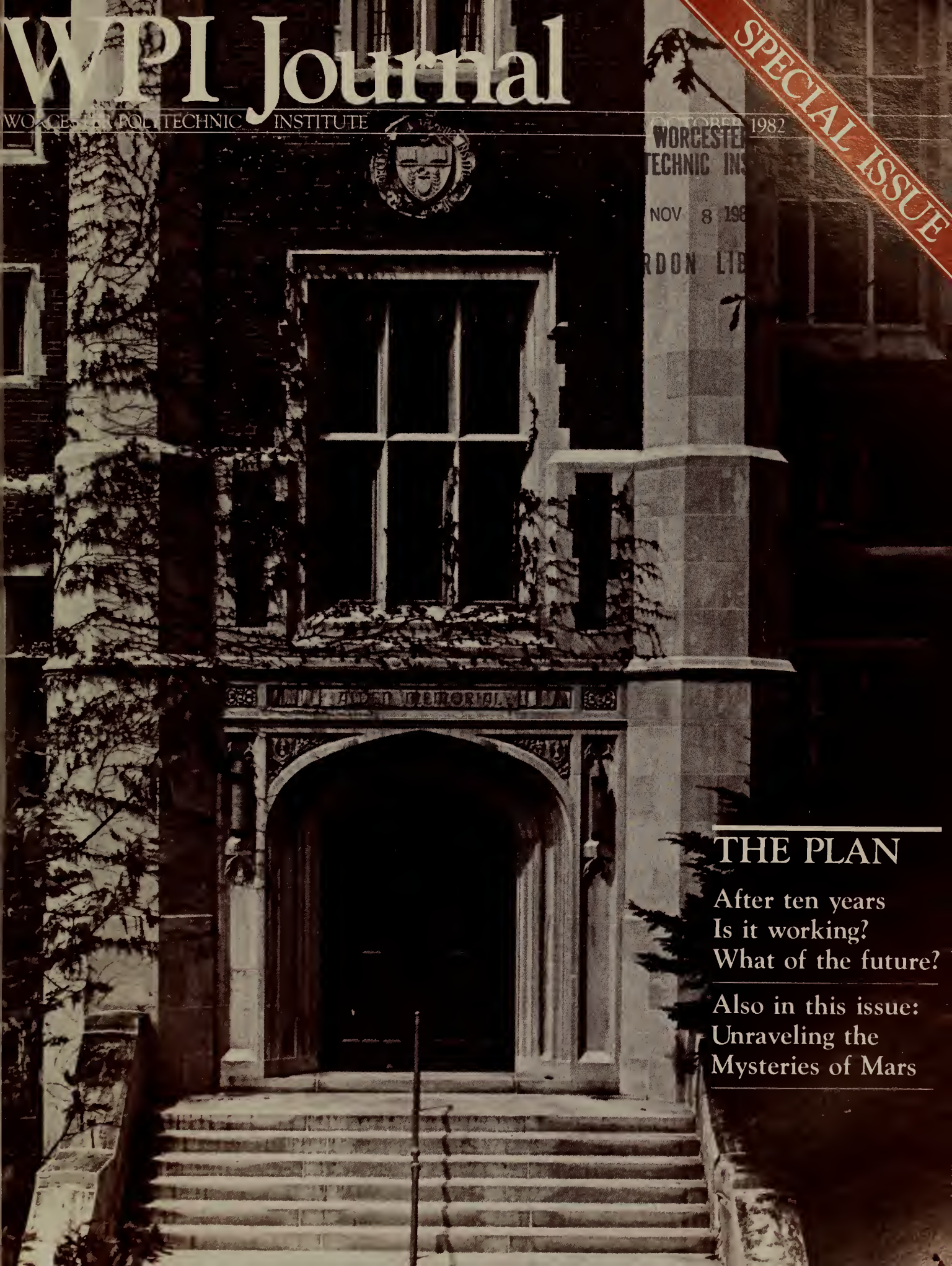
Don't miss it for the world!

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

OCTOBER 1982

SPECIAL ISSUE



THE PLAN

After ten years
Is it working?
What of the future?

Also in this issue:
Unraveling the
Mysteries of Mars

Michael Carroll

EDITORIAL

"This day closes the first decade in the history of the Free Institution. It has been a period of discovery and settlement, crowded with the perplexities and anxieties inseparable from new enterprises."

—Charles O. Thompson, 1878

By coincidence, it was precisely a hundred years later that we marked a decade of life under the influence of the WPI Plan, an educational enterprise of unprecedented scope and boldness.

Looking back at the history of the Plan, one can conclude that in 1968, a unique combination of events, personalities and attitudes came together at a critical moment. For individuals, for the college and for the nation, the era was one of rapid maturing. Forces from all sides, each with real or perceived stakes in our decisions, let it be known that the educational status quo was no longer acceptable. Institutions everywhere were feeling the rigors of change.

The fuse of the scientific and technological explosion had just been lit. But those educators with the sharpest vision were convinced that instilling tomorrow's technologists with deep concern for the consequences of their work to the lives of *people*—a controlled burn, if you will—is the only prudent way to generate the huge energies embodied in technology. Thus was the Plan born.

The Plan survives. But does it produce the kinds of engineers and scientists who are prepared to deal with a world of technological opportunities and challenges unimagined just ten years ago? And can it sustain WPI in a time of relentless competition—for students, faculty, facilities, and academics?

In this special issue of the *Journal*, we take a hard look at how the Plan has fared in its inaugural decade. And we peek into the future. What we found may astound you. —KLM

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

VOLUME 86, NUMBER 2 OCTOBER 1982

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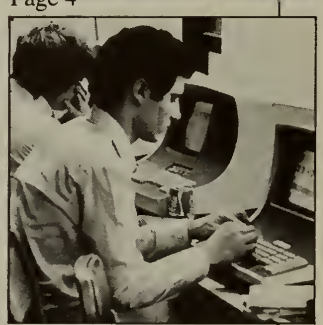

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Cover: Alden Memorial Auditorium, photographed by John F. Wellsman. Back cover: Student in Gordon Library, photographed by William Denison.

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Alumni Fund Goes Over the Top—Again

Cliffhangers? Nearly everyone associates them with double overtime NCAA national championships or Gothic novels. But in the WPI Alumni Office this year, the term also applied to the Alumni Fund.

On June 15, Gift Recorder Eileen Scopetski assured the staff that we would meet the $800,000 goal; in fact we would probably exceed it on June 30, the closing day for the 1981–82 Fund year. Still hanging in the balance, however, was whether we would meet the *other* major goal we had hoped to reach—40 percent participation. When the entire recording process had been completed, the word spread quickly through the entire office that a record 5,343 gifts had been made to the 1981–82 Alumni Fund—eight more than we needed to reach 40 percent! (Of course, as in Gothic novels, you knew there would have to be a happy ending.)

We quickly phoned Fund Board Chairman Henry Styskal, Jr. '50, who passed on the news to Fund Board members Richard A. Davis '53, Gerald Finkle '57, Richard B. Kennedy '65, Allen H. Levesque '59, John M. Lindegren '39, Philip H. Puddington '59, and John M. Tracy '52.

Banner years are becoming the norm for the Alumni Fund. With over 1,125 alumni volunteers leading the way, how could it be otherwise? For in addition to the $807,855 in alumni giving, an additional $237,223 in unrestricted funds had been received from the 223 corporations who matched gifts during the year from their employees. A total of $1,045,078 in unrestricted gifts were generated for the Fund from alumni—another unprecedented performance!

When the final Fund report was mailed in late September, it included yet another major announcement. On July 12, at the national assembly of the Council for the Advancement and Support of Education (CASE) in Toronto, Sharon C. Davis, Managing Director for the Fund, and Stephen J. Hebert, Alumni Director, received on behalf of the alumni body another CASE/U.S. Steel Foundation Award for Sustained Excellence. The WPI Fund has now received this award for four consecutive years. (Only two other institutions in North America, Dartmouth College and the University of Michigan, have been so honored.) This award reflects the ingenuity, time, and diligence of scores of volunteers not only this year, but for years past.

Other highlights for the Fund year include:

- A record number of gifts of $1,000 or more—167 alumni were recorded as members of the President's Advisory Council for 1981–82.
- The reunion classes of 1932, '42, and '57 made gifts totaling $258,535, and established individual class scholarships for future generations of WPI students.
- Nearly 200 undergraduates volunteered an evening of their time in mid-April at the annual Alumni Fund Phonothon. They recorded $60,811 in pledges during this outstanding program; two sororities, Phi Sigma Sigma and Delta Phi Epsilon, raised the greatest dollar amounts—and both in the same evening!
- Among classes who participated in the Class Agent Program (Classes of 1935–81, but omitting those classes celebrating 25th and 40th reunions), the Class of 1935 led all classes in participation (64.8 percent), the Class of 1973 had the largest number of donors (191), and the Class of 1938 raised the greatest dollar amount ($32,344). In the Alumni Office, Head and Class Agents are fondly referred to as "super agents," and it's not difficult to understand why!

Acknowledging the significance of all these accomplishments is important, but one might ask how the Fund is spent? That's the best part!

In general, the Fund supports common

Undergraduates played a vital role helping the Alumni Fund reach the million mark.

needs and interests: quality academic programs that attract the kind of students and faculty WPI seeks. But more importantly, the Fund helps provide the financial resources that enable the college to retain these fine people. Frequently, part of the Fund can be used for small but important things for which other funds are not available—support for student project opportunities off campus or for new intramural sports activities. The beauty of unrestricted funds for current operations is that important projects can be supported during the current academic year according to priorities established by the college.

Of course, every *good* story has to have heroes and heroines, and the best part of the end of the Fund year is sharing news of the terrific results with all those who helped make it happen. Thanks very much for making the 1981–82 Alumni Fund the success it was!

WPI Champions Catch Henley Fever

They had to leave their $100,000 trophy back in England and take home pewter mugs instead, but it doesn't matter. The first-ever alumni contingent from WPI—plus two student crews—will never forget June 26, 1982, the day they won three trophies during the Reading Regatta, a preliminary trial race held before the world-famed Henley Regatta.

Says Dave Ploss, '70, long-time WPI crew coach and coxswain, "We had to beat eight teams to get to the finals, then our Senior 'B' team with cox defeated Eton Excelsior by a length." Marlow Rowing Club was third. WPI 'B' team winners were Peter Clapp, '81, John Marden, Steve Zimmerman and Carl Hefflefinger, '82, and Ploss (cox).

WPI's Senior 'C' with cox won by three feet over Henley Rowing Club, after Oxford Polytechnic was disqualified for interference. "It was close," Ploss says. "When Oxford was disqualified, Henley took the lead for a while. But WPI was ahead at the end, when it counted." Winning team members were Paul Doe and Brandt Bonin, '82, and Paul Quigley and Joe Iantosca, '83. Ploss again served as coxswain.

Alumni Fran Madigan and George Wespi, '79, Jay Feenan, '80 and James McGee, '81, placed a strong second to Yale University in the finals of the Senior 'A' without cox. Although the Yale crew is ranked No. 1 in the U.S., WPI lost to them by less than a length.

At right, alumni rowers warm up on Lake Quinsigamond. Below are the Reading Regatta champions: center, David Ploss. Front row (left to right): James McGee, Paul Quigley, Paul Doe, Fran Madigan, Jay Feenan, George Wespi. Back row: Peter Clapp, Stephen Zimmerman, Brandt Bonin, Joe Iantosca, John Marden, Carl Hefflefinger.

With two firsts and a second at the Reading Regatta, WPI captured the prestigious $100,000 team championship cup—"Temporarily," Ploss comments wryly. Its permanent home is England. (Rules of the host country.)

While participating in the regattas, the WPI crew stayed with English families, who opened their homes to them on a "bed and breakfast" basis. "Very friendly people," says Ploss. "But they couldn't get the hang of making American pancakes. One morning some of us showed them how, with American pancake mix and real maple syrup. They really made a hit!"

John and Ginny Giordano FitzPatrick, '75, English residents for the past two years, made a hit with the visitors by hosting them to a bountiful home-cooked banquet. According to Ploss, "Everybody ate so much at noon, no one could lift an oar for the rest of the day."

Bad luck, muscle pulls and the flu hurt WPI during the Henley Regatta. The Engineers led the Visitor's Cup competition, which was open to colleges and schools in the 4-without-cox category, but lost it in a heartbreaker just three strokes from the end. Ploss says, "At the last minute, a steering problem developed and WPI was disqualified."

In another Henley race, the Wyfold Cup open competition for 4 without cox, the alumni drew Neptune, the champion Irish national lightweight team, to row against. Although Neptune was ranked seventh in the world in 1981, the alumni moved well against the highly-ranked crew in a losing cause. (Jeff Peel, '74, a former English exchange student and oarsman at WPI, also rowed in the Wyfold semifinals. He and his wife also put out the welcome mat for the visiting WPI crew.)

WPI entered the Prince Philip-Grand Challenge Cup, also at Henley, which is open to any amateur 4-with-cox team in the world. The Engineers made it to the semifinals, where they were defeated by the Australian national team (who outweighed them by more than 30 lbs. per man).

The Henley defeats, closely following their stunning Reading victories, did nothing to cool the oarsmen's Henley fever. Fran Madigan, '79, vows, "WPI alumni will compete again next year. Count on it!"

Ruth Trask

Unraveling the Mysteries of Mars

On a lonely Martian plain, 206 million miles from earth, 37 minutes away by radio transmission, the Viking lander's sampler arm pushes slowly into the ground, scooping out a small trench, dumping the soil into a hopper leading down to the package of biological experiments on the lower deck. Before reaching the hopper, though, the red soil dribbles through a coarse and then a fine sieve. Then the scoop goes back to the trench for another load for a second hopper, which leads down to the gas chromatograph-spectrometer that examines the sample for organic chemicals.

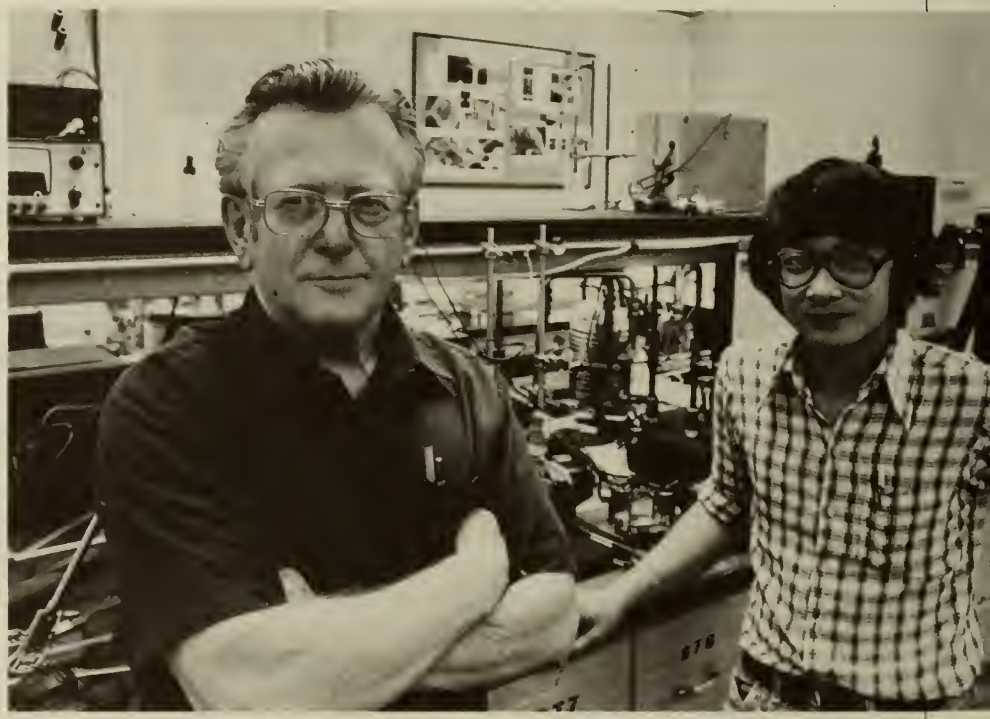
Is E.T. watching?

This sequence and others like it would be repeated countless times more in the months ahead, as the unmanned Viking lander pursued its mission some six years ago: to search for life—macro- or micro-organisms—on the surface of the planet Mars.

It was 1976, ten years since the National Aeronautics and Space Administration (NASA) had first conceived and begun preparing for the astonishing Viking expedition, a project rivaled only by Apollo's manned moon landings and the more recent Voyager fly-bys of Saturn. For Viking would land not one but two scientific stations on Mars, the first in late July (planned originally for July 4, to coincide with the bicentennial), the second three months later.

At last, thought Mars-gazers, the centuries-old mysteries of the Red Planet would be resolved once and for all.

From his Goddard Hall office, WPI Chemistry Professor Robert B. Plumb watched the expedition attentively. Already he'd consulted to NASA, a relationship that would continue throughout the mission. But his most dramatic role in this enticing who-done-it wouldn't unfold for another six years. More on that later. But first, some background.



Professor Robert C. Plumb (left) and Rewat Tantayanon.

Viking's package of experimental equipment resembled a can of sardines. Besides biological and chemical apparatus, a host of meteorological, geological, and other instruments measured everything from wind velocity to seismic phenomena. But the biological tests attracted the largest following among scientists and the public.

Besides scanning by television camera for beasts or rodents scurrying across the Marscape (admittedly a low probability), three biological experiments took place: pyrolytic release, gas exchange and labeled release (LR). In the LR test, soil samples were exposed to an organic nutrient labeled with carbon 14, a radioactive isotope of carbon. If, during incubation, radioactive carbon compounds were released from the reaction, scientists could trace this effect to biological origins.

Of the three biological experiments, the LR test presented the most striking effects. But the cause of the apparently positive results of this test have until now remained a mystery.

At both the V1 and V2 landing sites, 1,000 km apart, different soil samples exposed to C14 yielded similar, robust releases of radiation, indicating the presence of life in the soil tested (the theory being that the radiation is generated by micro-organisms metabolizing, or consuming, the radioactive compounds and releasing carbon dioxide, CO_2, labeled with C14). But when the same samples were given another dose of C14, instead of giving up more radiation, the level dropped dramatically and remained at a constant level.

Since this reaction is inconsistent with biological effects, scientists were given a clue that some other mechanism—perhaps chemical—was at work.

Meanwhile, as the plot thickened, back in Worcester Bob Plumb was postulating his own ideas and offering suggestions to the puzzled NASA biological team.

NASA needed more evidence. What, they wondered, would happen if different samples were sterilized by heat prior to the injection of the nutrient? Following more scooping and more incubating, tests indicated that sterilization—which would kill any micro-organisms—did in fact eliminate the release of radioactive gases from the soil. Now things were getting interesting. It was beginning to look as if there's life in them there hills after all.

Now, six years after Viking 1's landing pods kicked up the red dust of Mars, Professor Plumb believes he and his students, most notably Rewat Tantayanon, a Ph.D. candidate from Thailand, have unraveled the mystery. Their NASA-funded research shows that the effect found at Chryse and Utopia, Viking's landing sites, was purely chemical. In fact, they believe they have discovered and have synthesized at WPI a form of matter native only to Mars, a substance which may have broad applications here on earth.[1]

"One problem with the Viking experiments," Plumb said recently, "is that they put the cart before the horse, addressing the biology of the soil before they learned about its chemistry." Knowing the rate and amount of radioactive release, the effects of reabsorption and sterilization, and thereby being able to deduce the soil's acidity and desiccation, Plumb saw the problem as trying to uncover in an earth-bound lab the chemical mechanism that produced the effects observed on Mars, nearly a quarter billion miles away.

The WPI team theorized that a chemical agent in the Martian soil is responsible for the Viking finds. To uncover this compound, they studied several possibilities, including magnesium sulfate, exposing it to simulated Martian environmental conditions. The most striking of these conditions is Mars' day-night temperature extremes—falling from a day-time high of 0 degrees C. to −80 degrees C. at night.

The results are startling. When this temperature variation is duplicated in the lab, the volume of the magnesium sulfate jumps by a factor of seven—roughly equivalent to the difference between sleet and snow.

"This morphological transformation, in which crystals are broken down into a coral-like arrangement, has never before been observed on earth," says Tantayanon. "We're nearly 100 percent certain that magnesium sulfate exists on Mars and that simple temperature fluctuations there produce the same effects we observe in the lab."

With this material in hand and with a new-found understanding of the chemistry underlying the LR reaction, Plumb and Tantayanon have for the first time reproduced Viking's findings here on earth. Many other labs worldwide have tried and failed. As a bonus, their work provides a measure of the acidity and desiccation capacity of Martian soil. And incidentally, the gas emissions of the LR experiment were *not* CO_2, as most scientists assumed.

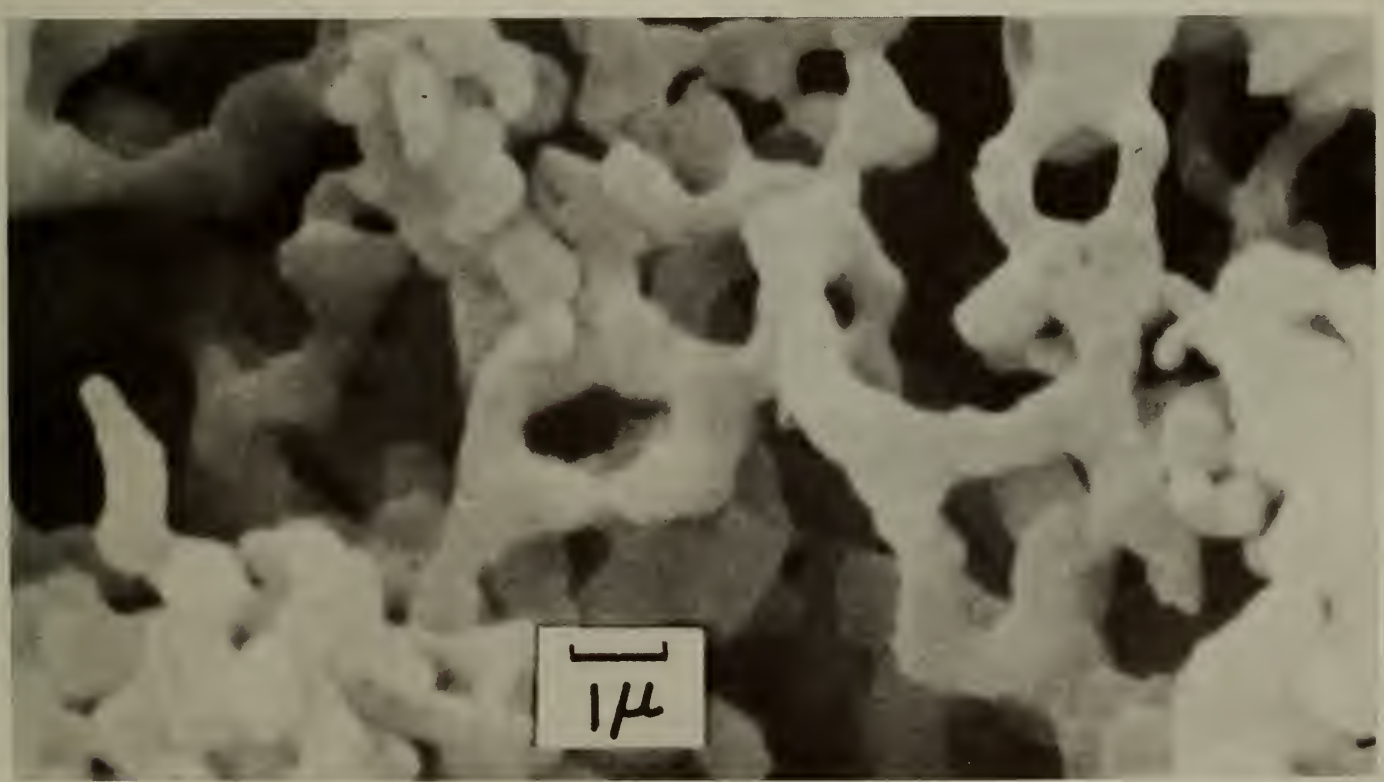
"Our findings strike a crucial blow to the belief that Mars holds life," Plumb says. "But life on Mars isn't our major interest. As chemists, we're interested in the chemistry that defines life. Our real objective has been to find the chemical processes that occurred in the first 'chemical' experiment ever carried out on another planet. Mars is just another majestic scientific puzzle."

The new high surface-area material Plumb has developed may have applications here on earth in the chemical industry, for example, as a super desiccant to soak up water from organic compounds.

According to Dr. Edward N. Clark, Associate Dean of Graduate Studies and Director of Research, "Professor Plumb's research is some of the most elegant work I've ever seen, some very fine scientific detective work."

Plumb sees things on a more earthy level. "If we can understand the chemical evolution of other planets, we can probably learn more about the chemistry and life of our own environment."

[1]Properties of this new material have also been studied by H. Peter McClain, '80 CH, Rodney Poole, '80 CH, James Toomey, '82 MS, and Sermin Üren, a Ph.D. candidate.



Coral-like crystals of magnesium sulfate exposed to Martian environmental conditions. Other-world material created on earth?

William Denison

The Plan: Is

By Shannon T. Devoe, Ph.D.

What does a decade of research to evaluate the WPI Plan have to say? Plenty:

- *First, the Plan is effective in attracting highly qualified students who have the potential to become competent scientists and engineers.*
- *Second, WPI does indeed prepare these students to become professionally qualified.*
- *Third, the Plan achieves more than merely training students for technical competence. WPI produces graduates who are confident of their abilities, who can integrate ideas from a wide variety of fields, who are creative problem solvers, and who can communicate effectively. They appear committed to social, cultural, and political involvement in their communities. And in the early stages of their careers, at least, they see themselves as more successful in and more satisfied with their jobs than a national comparison group.*

The statistics tell the story. In separate studies of applicants, freshmen, seniors, and graduates, all indications are that the WPI Plan is meeting—and often exceeding—the goals of its framers.

The results are intriguing and compelling. So is the story behind them. *–Ed.*

The Way It Was

Roger Perry, WPI's Director of Public Relations, remembers the scene vividly.

"President Harry Storke leaned back in his chair," he recalls, "and reflected pensively, 'I'm afraid I didn't make many friends today.' "

"Now what did you do?" Perry asked wryly.

"I've just appointed a committee of bright young faculty to conduct a study and tell me what this college should be ten years from now."

It was December 12, 1968. This appointment was the beginning of the WPI Plan.

When he took the reins in 1962 as WPI's tenth president, Storke recognized the school's tradition of excellence. He also saw a capacity for even greater things—a capacity he believed it had yet to utilize fully. From the beginning he had tried to nurture that potential for greatness through the established hierarchy. At the time, academic matters were handled by the various tenured department heads. The faculty as a whole had little to say in academic affairs except as it might convince the assembled department heads.

Storke told Perry often of his frustrations in trying to move this entrenched body to long-range planning—an activity Storke believed imperative for meeting the dynamic needs he

It Working?

The year: 1968. On college campuses across the nation, students and faculty joined to examine with a critical eye the most cherished ideals of education and our very way of life. Many precepts were found wanting. Retrieved headlines of riots at the nation's Columbias and Berkeleys are stark reminders of those turbulent times. Change was in the air.

At WPI, meanwhile, change was indeed on its way, but through constructive means, not destructive ones. The college saw the need to examine its educational program and found it to be solid, but neither distinguished nor distinctive. Faculty, at least, were deeply concerned that the heavy emphasis on coursework and examinations was stunting students' curiosity and creativity. There appeared to be a separation between the activities for which students were rewarded at the Institute and those in which professional engineers and scientists were engaged and for which they were rewarded.

But the disparity between training and practice was not limited to WPI. A year earlier, an American Society for Engineering Education report had stated, "Regardless of the academic route, the central characteristic of engineering is the creative synthesis of new systems and components. New learning experiences in this direction are much needed, and should provide a real challenge in engineering education."

The need for change in engineering education was thus established. In addition, there appeared a need for a new *kind* of engineer, one who could approach a broad range of social and environmental problems, one who would be aware of the impact of technological advances on society as a whole. Yet engineers had traditionally been less likely than any other group of college graduates to become involved in this broad range of problem areas.

Some colleges responded to this call for the "new" technologist by introducing into their curricula new courses in design and other quick-fix solutions. At WPI, the response was a total restructuring of the undergraduate learning experience. After more than a year of self-study, soul-searching, and discussion, the faculty and Trustees endorsed the following statement of goals:

> By means of coordinated programs tailored to the needs of the individual students, it is the fundamental purpose of WPI to impart to students an understanding of a sector of science and technology and a mature understanding of themselves and the needs of the people around them. WPI students, from the beginning of their undergraduate education, should demonstrate that they can learn on their own, that they can translate their learning into worthwhile action, and that they are thoroughly aware of the interrelationships among basic knowledge, technological advances, and human need. A WPI education should develop in students a strong degree of self-confidence, an awareness of the community beyond themselves, and an intellectual restlessness that spurs them to continued learning.

Less than a year after the endorsement of this statement, the WPI Plan emerged as a means for implementing these goals. The Plan called for competency-based education, with an emphasis on learning through projects, independent study, and collaboration with both faculty and other students.

In addition, the traditional grading system was replaced by one in which students could complete course and project requirements with distinction, pass, or (if they do not pass) with no record of failure. The academic calendar was changed from two fourteen-week terms to four seven-week terms, with optional three-week intersession and seven-week summer terms. Courses were seeking in their curricula greater relevance to the real world. The mood had spread to WPI as well. The times were right for change, and Storke sensed it. For several years, faculty and students alike had been chafing under the rigid prescribed curricula. In some departments, EE for example, professors had begun innovative programs to broaden students' educational experience. Faculty had successfully initiated expanded humanities electives. And women were first admitted to WPI in 1968.

saw ahead for WPI. As a retired Army lieutenant general, Storke was accustomed to governing through his chain of command. Since he wasn't getting the action he wanted, he had taken a step foreign to his years of leadership experience; he had bypassed his chain of command and asked his junior officers to do the task he knew must be done.

While his appointment of a faculty planning committee may have alienated some of the powerful department heads, who were not informed prior to the appointments, the move nevertheless was a popular one among faculty. His unorthodox move turned out to be a carefully calculated risk.

Throughout the nation, the late sixties were a time of reassessment of many social institutions and values. On campuses everywhere, students

Former WPI president Harry Storke. He had a vision.

In his charge to the committee, Storke explained that they were to concentrate on the broad objectives of the college and not become entangled in the details of needs and curricula in individual programs. Most important, he emphasized, was that they develop sound objectives—principles on which WPI's renewed mission would be founded.

For three months the committee labored. They carefully analyzed the existing strengths and weaknesses of the college. In developing recommendations, they sought the active participation of colleagues and students, for sweeping change required broad support if real advances were to be made. Finally, a comprehensive educational program had to be designed—one to which the college could direct its energies, one which could be articulated to a generation of students demanding relevancy, and one which could attract the necessary funds.

The committee found enthusiastic and sincere support from their constituencies in this work. They submitted their first report in March 1969. It discussed 12 possible types of institution which WPI could become. It also included a recommendation that planning continue and that faculty and students devote time to discussing the planning effort to date.

Then the committee resigned.

"Our resignation was one of the most important actions we

could be taken in a variety of ways—students could attend lectures, watch video-tapes of classroom presentations, or meet the course requirements through successful completion of an Individually Paced Instruction module. Sequences of courses were recommended, but not required. Students were responsible for planning their own courses of study; the role of the faculty member thus changed from that of arbiter to mentor. Virtually no aspect of the educational environment was left untouched.

WPI freshmen scored 150 points above the national average on SAT math tests.

In one broad sweep, WPI had transformed its role from that of the traditional engineering school to that of pioneer in the realm of innovative, creative educational investigation.

Further, this dramatic transformation took place, not in a matter of decades, but in a matter of years. In June 1972, three students graduated under Plan requirements; in June 1973, the number was 21. By June 1974, 32 students were Plan graduates; by June 1975, fully 50 percent of the seniors graduated under the Plan; that number was 90 percent in June 1976. By 1977, WPI was all Plan, with no other options available.

The Evaluation Strategy

When WPI committed itself to the Plan, it also committed itself to a long-term, intensive effort to evaluate this bold educational framework. The ultimate question, of course, remains: "Does the Plan work?"

Obviously, one of the original goals of the Plan was to graduate technically competent engineers and scientists. To measure this factor, external measures—assessments by qualified third parties—are required. However, the goals of the Plan go further: to produce graduates who are also more self-confident, more self-directed, more creative and resourceful in approaching and solving problems, more aware—of themselves, their technological expertise, other people, the society in which they live—and more effective in interacting with others.

As one reads through the Plan literature, certain ideas and phrases appear repeatedly which seem to cluster under three categories:

1. *Personal characteristics* (e.g., enthusiasm, self-confidence, maturity, self-motivation, responsibility, self-discipline, creativity)
2. *Skills* (ability to learn on one's own, ability to integrate ideas from diverse fields, ability to communicate effectively, ability to work with others as part of a team, ability to take a leadership role in working with others, ability to analyze problems across a wide range of issues)
3. *Values* (desire for life-long learning, desire to help others, desire to be involved in the social, cultural, and political life of the community)

Although these "value-added" characteristics are more difficult to measure, they are the features that distinguish a Plan education from any other. Most of the studies reviewed here have tried to measure these characteristics, skills, and values through self-reported and external assessments.

In sum, then, the evaluation strategy called for self-reported and external measures of both technical competence and personal characteristics, skills, and values of WPI students and a comparison group. Measures were made when students entered college, when they graduated, and at some time after graduation. Now, after ten years of assessment, we have in hand the statistical evidence to enable us to answer objectively the question, "Does the WPI Plan work?"

Salisbury Laboratories have been renovated.

took," recalls William R. Grogan, '46, Dean of Undergraduate Studies, at that time an EE professor. "We had been appointed by the president, but we felt that if this planning effort were to be successful, the committee planning the next phase had to be elected by the faculty itself." Except for one member who chose not to continue, the original committee with one addition was overwhelmingly elected by the faculty.

"This represented a major turning point in the role of the faculty in college governance at WPI. And it brought WPI into line with the structure of most of America's leading colleges and universities."

The first Planning Day attracted wide faculty and student participation, and served to narrow the 12 possible scenarios down to just four.

Planning continued with renewed vigor. Subcommittees were formed, and, for the first time, students were invited to participate on an equal footing with faculty members. This marked a major turning point in the faculty-student relationship. It was no longer "them" and "us." Now it was "we."

In June 1969, at age 64, Harry Storke retired, a year before WPI's then mandatory retirement age. He had accomplished what he'd set out to do, and the time was right to turn over command to a president who could lead the college through the radical changes that were to come.

The trustees selected Dr. George Hazzard to succeed Storke. Hazzard often said that he would have had no interest in the position except for the challenges of implementing the Plan.

And the challenges were many. Hazzard brought to his office many years of experience as an educator. He could empathize with the faculty as they labored to resolve the inevitable conflicts in formulating the eventual WPI Plan. For the Plan was totally a new concept, modeled after that of no other college. There were no leads to follow.

In December 1969, after considerable debate, the faculty endorsed a statement of goals for WPI. This important step established the framework on which the next phase of intensive planning was based. The following June, the WPI Plan was formulated in essentially its present form. It was accepted by the faculty and soon thereafter was approved by the trustees. The trustees stipulated that, naturally, such change would require economic justification. Grants totaling nearly $3 million were provided by the National Science Foundation (NSF), the Alfred P. Sloan Foundation, and several other charitable organizations for implementation and evaluation.

President Emeritus George W. Hazzard. He made the Plan go.

Now WPI found itself committed to one of the most sweeping educational innova-

EVALUATION RESULTS

Applicants and Incoming Freshmen

One measure of the Plan's viability is the degree to which WPI has been able to attract prospective students. During the early years of the Plan, the numbers of applicants decreased significantly, then increased just as significantly, with large jumps in 1976, 1979 and 1980.

The school's ability to attract students has continued (see graph, page 10), even when WPI practiced a policy of negotiated admissions and accepted virtually any applicant who met basic high school course requirements and was willing to accept "self-admit" responsibilities. Scholastic Aptitude Test (SAT) scores of incoming WPI freshmen have declined slightly over the past decade, reflecting a national trend. However, the average Verbal SAT scores of WPI freshmen continue to be some 80 points higher than the national average, while the average Math SAT scores for WPI freshmen continue to be about 10 points higher than the national average.

Median class rank for WPI freshmen has increased systematically. In 1973, 50 percent of the incoming freshmen were in the top 18 percent of their high school graduating class; in September of 1982, 50 percent of the incoming freshmen were in the top 8 percent of their high school graduating class.

Obviously, the rosy picture painted by the figures on incoming freshmen is colored more strongly by the facts that they represent the tail end of the baby boom, and that engineering has become markedly more attractive over the past decade. Nevertheless, a comparison of the numbers of applicants to WPI and to the Massachusetts Institute of Technology (MIT) indicates that WPI is attracting more than its share of this growing pool of prospective students. Since 1977, the numbers of applicants to MIT

tions this nation had ever seen. The faculty and trustees had staked the future of the college on an educational program which had never before been tried—anywhere.

In place of conventional degree requirements met by passing a prescribed number of courses, most of which were required, the WPI Plan, which began in 1971, has these requirements:

- A major project in the student's professional field, known as the Major Qualifying Project (MQP)
- A major project which relates technology to the needs of society, known as the Interactive Qualifying Project (IQP)
- A Sufficiency in the Humanities, similar to a minor program
- A Competency Examination after the completion of three years' work, normally in the form of a week-long design or other problem, a written report and an oral exam, to establish that the students are indeed prepared to enter their chosen professional fields.

Under the Plan, all courses are elective and are chosen after consultation with faculty advisors.

The Plan places great responsibility on the students for identifying and achieving their own educational goals. Said Grogan recently, "From the beginning of the Plan, we were concerned that students not only benefit from classroom teaching, but learn how to make decisions—beginning with decisions that affect their very education." Projects are the basis of this experience. Students now tend to view faculty as colleagues in the educational process.

Not surprisingly, a decade ago, many alumni were deeply concerned over the changes planned at their alma mater. Most wanted assurance that these changes would make WPI an even better college than the one they'd known as undergraduates. A few were adamantly opposed to any changes in the WPI they'd come to love.

Today, the vast majority of alumni—both Plan and pre-Plan graduates—express pride in their alma mater, due in large part to the foresight and courage of the Plan's architects. In just over a decade, WPI has witnessed the enactment of an educational system which is today unique in the world, a system which skeptics warned would never work, but which is alive and healthy.

"Those early Plan years were often turbulent ones," Hazzard reflected recently. "Change was argued vigorously at every point—as well it should have been." So vigorous was the debate, that NSF advisor David Reisman of Harvard University predicted outright revolution among faculty and students. "But, if anything," says Grogan, "it's brought the WPI community closer together."

Demands on faculty and students—inherently more exacting in a project-based program than in conventional classroom teaching alone—have and will continue to be great. But in terms of enhancing the faculty-student relationship and preparing students for professional experiences—the real mission of the Plan—the rewards are great.

has increased by 26 percent, while the number of applicants to WPI has increased by 68 percent. And from 1981–1982, the number of applicants to MIT fell by 2 percent, while the number of applicants to WPI jumped by 8 percent. The WPI Plan is clearly attractive to students of high academic standing.

Studies of Freshmen

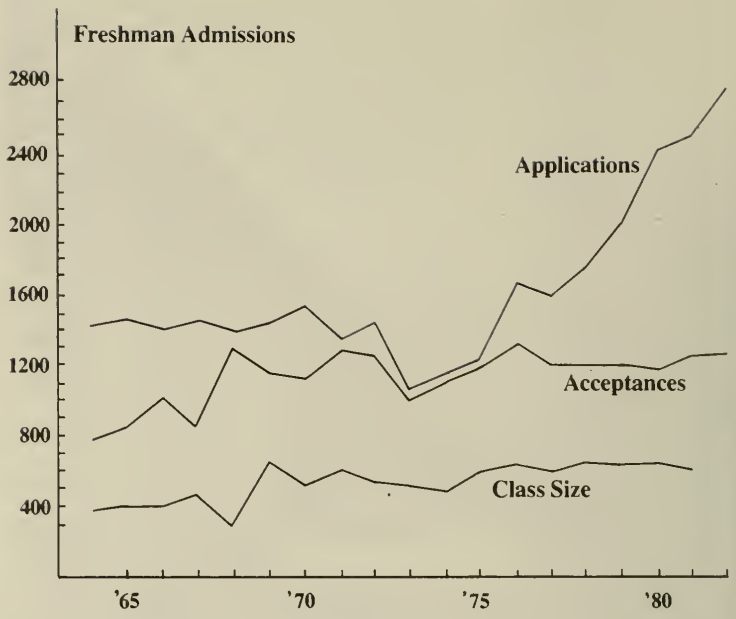
Given the distinctive attributes of the Plan, we can ask whether WPI attracts students who differ in personal characteristics, skills, values or competence from the students who have traditionally entered WPI and similar colleges of engineering and science.

In one study, Dr. Karen C. Cohen (1975) asked entering freshmen at WPI to fill out a standardized questionnaire prepared by the American Council on Education (ACE). The ACE data for WPI classes entering in 1973 and 1974 were then compared with the ACE data for freshmen entering two other technological colleges similar to WPI in the size and composition of their student bodies.

An examination of questions which related to academic competence indicates that these two incoming classes did not differ significantly from each other or from freshmen at the two other colleges in terms of SAT scores, high school class rank, or average grades while in high school.

Questions which reflected personal characteristics, skills, and values indicated that freshmen entering WPI in 1973 and 1974 did not differ significantly from freshmen entering the comparison schools, except that

- WPI freshmen were significantly more likely to indicate that they planned to obtain a degree beyond the master's level.
- WPI freshmen were significantly more likely to cite "working with ideas" as an important reason for making a long-term career choice, and significantly less likely to cite "high anticipated earnings" as the basis for this choice.



Greater selectivity is the bottom line for WPI admissions under the Plan.

- WPI freshmen were more likely to note "the special educational programs being offered in the school" as the reason for choosing WPI.

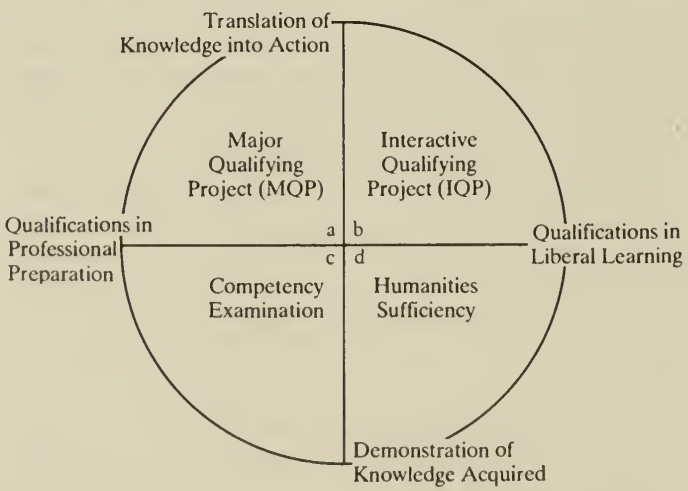
Studies of Seniors

Several studies of seniors have been conducted, one in which Plan seniors were compared to non-Plan seniors in the same WPI class, and two in which company recruiters were asked to com-

Projects—The Plan's Lifeblood

Picture yourself as a freshman entering the WPI Class of 1986, confronting the 284-page *Undergraduate Catalog*, the gospel of the WPI student. Things start to get interesting around page 13. Quote:

> There are four academic degree requirements, each of which is performance based and each of which is directly related to the goals of the college.
>
> These requirements might be considered in four quadrants [Already you realize you're in for an adventure], developed through two "knowledge" groupings of goals:
>
> 1. Professional Preparation (a,c) and Liberal Learning (b,d)



2. Translation into Action (a,b) and Demonstration of Knowledge (c,d) as illustrated in the diagram below.

Unquote.

Studying this diagram, you begin to realize just how big a role projects—MQPs and IQPs—play in the WPI educational experience: They will constitute two of your four academic degree requirements.

The next 25 pages of the catalog go on to discuss nearly every conceivable element of the projects program—from how to choose and begin your MQP or IQP; to on- and off-campus opportunities; to descriptions of special IQP programs, such as the Issues Research Collaborative and the Washington, D.C., Project Center; to discussions of each of the six IQP topic divisions, like Energy, Resources and Environment, and Issues in Economic and Social Development; to where you can get *more* information on projects.

"As far as we know," says Frank Lutz, Associate Dean for Projects, "no other college has a projects program that rivals WPI's. It's a lot to explain."

Despite well-conceived and articulate explanations and accounts of the projects program in the school's internal and external literature, and though projects are an integral part of

pare WPI seniors with seniors from other colleges of engineering and science.

In terms of technical competence, results from these studies have been mixed:

- Using Engineer in Training Examination scores as a measure of technical competence, Dr. Cohen found that Plan seniors, class of '75, scored significantly higher than did non-Plan seniors from the same WPI class.
- In two studies in which company recruiters were asked to rate WPI seniors relative to seniors from other colleges of engineering and technology, recruiters rated WPI students somewhat above average in terms of knowledge of fundamentals in their major field, technical ability, and general engineering knowledge. But, when asked in what ways, if any, WPI seniors differed from seniors at other similar colleges in which they had recruited, technical competence, per se, was not one of the most frequently mentioned items.
- In terms of personal characteristics, skills, and values, Dr. Cohen found that WPI students on the whole rated themselves as significantly more flexible and more broad-minded than did students at the comparison college.
- Company recruiters rated WPI seniors *above* average compared with other seniors in terms of their ability to integrate ideas from various fields and to communicate effectively, as well as in terms of their self-confidence and enthusiasm.
- In fact, of those able to make the comparison, over 80 percent said WPI seniors were different in a positive way—in teamwork, maturity, well-roundedness, and the ability to get things done and adjust to the world of work.

This evidence suggests that WPI seniors do reflect at least the "value-added" objectives of the Plan and are possibly above average in technical competence. But since none of these studies employed an explicit control group, the evidence remains suggestive rather than definitive.

Studies of Alumni

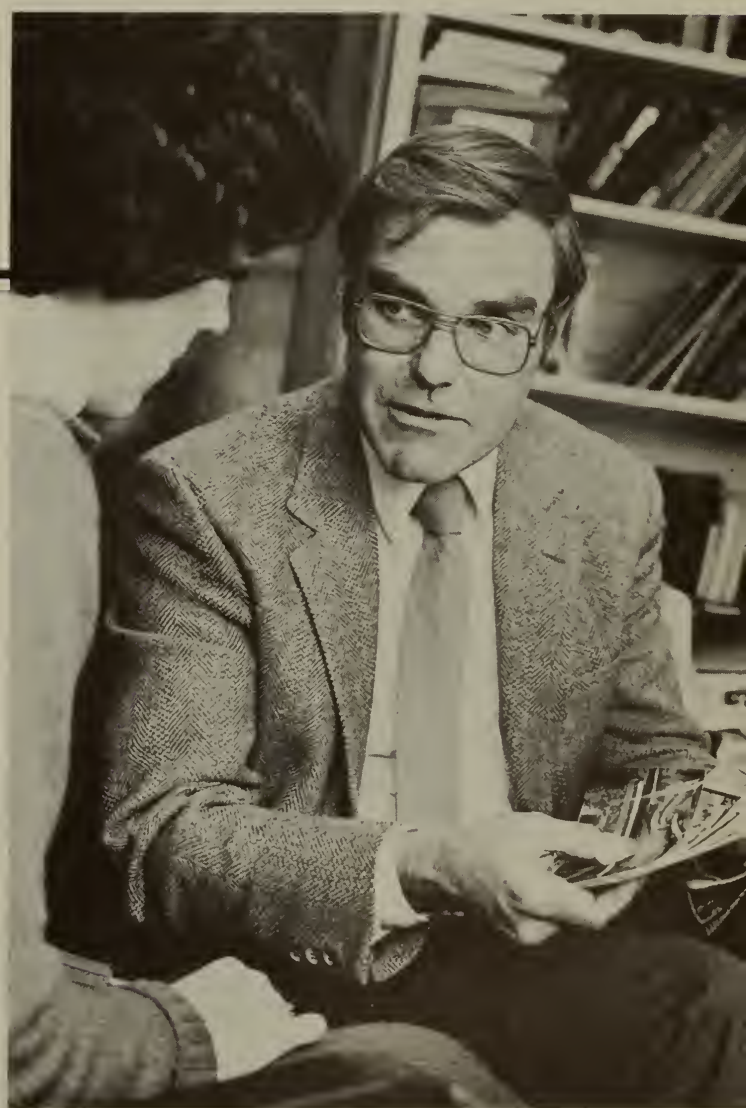
Two major studies of graduates in the early stages of their careers have been conducted. The first of these, conducted by Dr. Cohen (1978), involved WPI Plan graduates, alumni of a comparison college, and job supervisors of both groups. Here, both the graduates and their supervisors rated the technical competence, personal characteristics, skills, and values of the graduates.

In terms of technical competence, graduates of both WPI and the comparison school rated themselves above average on knowledge of fundamentals, ability to learn on their own, ability to get things done, and performance on the job. Similarly, the supervisors said both groups of graduates were above average on these factors.

But while these studies have not indicated that the Plan has produced graduates who are more competent technically than the comparison group, neither are they deficient. The studies indicate that WPI has always produced technically competent graduates, and continues to do so under the Plan.

Granted that the Plan is producing technically competent students, to what extent has it succeeded in producing graduates who demonstrate those "softer," value-added characteristics mentioned earlier?

The first hint that the Plan might be succeeding in these more amorphous areas came when the same Plan graduates, class of



the WPI experience, the benefits of this element of the WPI Plan to students and project sponsors remain perhaps the most difficult to measure. And to anyone who's neither graduated under the Plan nor been on the sponsor end of things, the IQP, at least, may be the most puzzling aspect of WPI's educational structure.

But to James S. Demetry, Chairman of the Division of Interdisciplinary Affairs (DIA), which administers the IQP program (and an EE professor), the rationale for projects is uncompromising. "Any thinking, observing individual must conclude that a concentrated, seven-week experience that encourages expanded awareness and an appreciation for the complexity of things; that exposes a world that's very political, and where decisions are made in complicated, often extra-technical ways; and that demonstrates first hand that we all have an obligation to a community far bigger than the microcosm we call 'the company'—this experience must surely help prepare students for future professional careers." Mom and apple pie? Sure, he admits, but it may help discourage a myopic view of a complex, turbulent world.

Mechanical Engineering Professor Raymond R. Hagglund concurs. A veteran advisor on scores of projects, he points to a host of project requirements that mirror professional activities: understanding the problem, interacting with a project team and management, preparing a proposal, setting a course for attacking the problem, managing time

Professor Raymond Hagglund, ME, veteran project advisor.

1976, were interviewed about a year and a half after graduation. Compared to a group of 1976 graduates from a traditional college of technology, the WPI graduates were:

- More likely to be involved in post-graduate studies.
- More likely to be using their college majors on the job only somewhat or not at all, and to be involved in jobs that were not traditional for their majors.
- Rated by their supervisors as better communicators.

What's more, despite their relatively wider range of current positions, correlations of supervisor ratings for graduates' skills and the importance of these skills for the jobs held were significantly higher for WPI grads. Said one supervisor, "Our WPI grads may be just average on some things, but on everything that's important to us, they're above average."

In summarizing the results of this study, Dr. Cohen noted that, "Although the groups [from WPI and the comparison school] are still remarkably similar . . . WPI graduates are consistently viewed as having a slightly different set of skills than the [comparison school] graduates. . . . In brief, it seems fair to conclude that the WPI Plan has been demonstrably effective at the undergraduate level. Its graduates are certainly rated well, are more effective communicators, and there are indications . . . that they are opting for, and succeeding in, a wider variety of professional roles than were 'traditional' for their majors."

Perhaps the most compelling evidence that the Plan is indeed producing a different breed of engineer comes from Dr. Geoffrey E. Bock's 1981 study.

Here, Plan graduates from the classes of 1976, 1977, 1978, and 1979 responded to a lengthy questionnaire about their current job characteristics and sources of satisfaction, the extent to which their college education had prepared them for the jobs they currently held, the general usefulness of a college education, and their personal values and aspirations for the future. The responses of WPI Plan engineering majors, then in the early stages of their careers, were compared to the responses of a national sample of engineering majors in the same career stages.

In some respects, Plan engineers and the national sample are similar: 95 percent of both groups are employed full time; approximately 40 percent are currently working toward a degree beyond the bachelor's; more than 75 percent are currently work-

Under the guidance of a computer science major, fourth graders are brought into the world of the computer—a tool many of them will be using before long.

and budgets, writing and presenting a final report to management, and, most critically, he says, "taking responsibility for their actions. It's projects that make the pace at WPI faster and more stimulating than at any other college I can think of."

"When the Plan began," recalls Lutz, "a recurring fear was that we'd never be able to attract enough projects from industry." The program has always relied for off-campus exposure on faculty, student and alumni contacts as well as word-of-mouth, he says. That fear soon vanished. Today, though 1,100 projects are conducted annually, Lutz and his staff are overwhelmed by proposals from industry. But, being able to be selective is a mixed blessing, he contends. "We can choose those that indicate the best fit between sponsor needs and students' interests. But in rejecting even good proposals, we don't want to turn off sponsors to future involvement."

Projects are an established part of the Plan, says Demetry, but they—especially the IQP—require constant nuturing, fine tuning. MQPs, he believes, have a natural home in the various academic departments.

IQPs, on the other hand, often cut across disciplines.

Demetry cites a favorite example which helps to distinguish between MQP and IQP topics: the computerized automobile interlock. This device, if installed in your car, requires you to recall a sequence of numbers flashed briefly on a screen before you can start the engine. Its obvious job is to discourage the intoxicated driver from ever getting on the road. On this subject, a typical MQP would address some aspect of the computer technology that drives the device. But application of the technology raises issues such as the appropriateness of encumbering individuals' use of their own property, and the rights of the individual versus the right of society not to be endangered by intoxicated drivers. As with so many decisions, says Demetry, one must

ing as engineers; and approximately 90 percent feel they are best trained to be engineers.

But this is where the similarities end.

- While more than 50 percent of both groups are employed by manufacturing and construction firms, a significantly higher percentage of WPI engineers are working in such firms, and a significantly lower percentage of WPI graduates are employed by federal, state, or local governments.
- The groups differed in terms of the skills they feel prepared to perform and the extent to which their jobs call for them to perform these skills: Nine percent of the national sample, vs. 51 percent of the WPI engineers, felt prepared in the design area.
- A significantly higher percentage of WPI engineers are engaged in construction and design.
- Only 26 percent of WPI grads, vs. 41 percent of the national sample, felt prepared to perform mathematical, statistical, and actuarial procedures, although the WPI grads who do perform these procedures felt so prepared.
- Beyond the field of engineering technologies per se, significantly higher percentages of WPI engineers felt prepared to write, to speak to groups, and to lead discussions, while a significantly higher percentage of the national sample of engineers felt prepared to teach.

Thus, Plan engineering graduates feel equally well prepared for engineering, and much better prepared for design work and for written and oral communication than do their counterparts.

The preparations of WPI engineers for work appears to be different, and in fact, for many, the work they do is different. Once again, a significantly greater percentage of WPI graduates indicate that their current job is only somewhat or not at all related to their undergraduate majors. The reasons for this status appear to be voluntary, e.g., preference rather than lack of opportunity, interest in a non-related job, better opportunities. As Dr. Bock notes, "Plan engineers [in comparison to the national sample] appear to be prepared for a greater diversity of technical tasks and to have a wider variety of non-technical skills when they enter the labor force . . . [The data] suggest that [Plan engineers] are becoming involved in a greater diversity of careers than the national comparison groups."

Significantly higher percentages of WPI engineers indicated that their jobs involved working on a professional level, supervising others, having policy- and decision-making responsibilities, setting their own hours, designing their own programs of work, and full utilization of their skills.

Both recruiters and supervisors rate WPI seniors better at integrating and communicating ideas.

- WPI engineers seem to be assuming more responsibility, and to be having more autonomy, than a national sample of engineers at a comparably early stage of career development.
- A significantly higher percentage of WPI engineers indicate that they are well paid in comparison to others at the same job level, both in their own place of employment and elsewhere, that they are satisfied with their career progress to date, and that the current job fits their long-range career goals.
- WPI engineering graduates thus appear to be more satisfied with their current job responsibilities and prospective careers than do engineering graduates from the national sample.
- Significantly higher percentages of WPI engineers indicated that they were very satisfied with the autonomy, independence, extent of responsibility, opportunity for creativity, and variety in activities entailed by their current jobs.

Not only are WPI engineers more satisfied with their jobs than the national comparison groups, they appear to have more reasons to be satisfied. As Dr. Bock notes, "Plan graduates are more likely to feel they are succeeding in their current jobs. They

assess the costs and benefits of a decision to any group that it will affect. Such is the realm of the IQP.

Many projects can best be pursued away from the campus. WPI's Washington, D.C., Project Center was established in 1974 to provide exceptionally challenging IQP opportunities. Since then over 450 students and 33 faculty have completed nearly 170 projects in cooperation with 45 government agencies and private organizations—lobbying groups, consulting firms—and members of Congress.

Competition for the 30-or-so spots at the Center is keen. Last year over 100 students applied. For a seven-week term, these top junior and senior students live and work among the nation's top decision makers, working most often on the analysis of government policy options. Says Demetry, the world of policy is new and sometimes strange to most undergraduates. Engineering students, however, are by nature and preparation quite proficient at quantitative work and are good problem solvers. "With practice in the search for information and with the means by which inferences are made from such resources, they can develop an impressive facility with the concepts of policy analysis, its vocabulary and its application."

Recent projects include:

- For the office of Senator Paul E. Tsongas (D., Mass.), issues for international solar legislation.
- For the National Research Council, perceptions of management, labor and government on the social issues of applied CAD/CAM technology.

Associate Dean Frank Lutz. Annually, he oversees some 1,100 projects on and off campus.

- For the National Association of Manufacturers (NAM), evaluation of the effects of antitrust policy on cooperative research in the United States.

Brendon Somerville, Director of Innovative Technology and Scientific Policy at NAM, has good things to say about NAM's WPI experiences, which date back to 1974. "These encounters have been of extraordinary value to NAM." In seven short weeks, he observes, the

feel they have greater autonomy in their work, a higher degree of professional responsibility, and hence, a greater likelihood that they will be successful in the future."

In fact, when the graduates were asked to note the characteristics for which their college education had been very useful, significantly higher percentages of WPI engineers endorsed statements involving cognitive and personal development, e.g., increased general knowledge, increased creativity and ability to think clearly, and improved self-discipline, self-confidence, and perseverance. In contrast, the national sample of engineers saw the usefulness of a college education as primarily related to finding and holding a job. Thus, WPI engineers appear to be attributing much of their perceived success and job satisfaction to factors associated with their own very different kind of college education, and in general, they were also more satisfied with the educational aspects of their college experience than were their counterparts.

All in all, career prospects for WPI alumni are better than for the national sample.

Finally, when asked to indicate which personal values were essential or highly important to them, WPI engineering graduates continued to endorse values consistent with the Plan to a greater extent than the national sample of engineering graduates.

- A significantly higher percentage of WPI engineers indicated that influencing social values, helping others in difficulty, being a community leader, participating in community action programs, keeping up to date with political affairs, and participating in creative arts were very important to them.
- The national sample, on the other hand, was more likely to indicate that never being obligated to people was a very important value.
- WPI graduates scored significantly higher on most statements involving personal characteristics, skills, and values which are consistent with Plan goals; they do not differ significantly from the comparison group on most outcomes that are not particularly relevant to Plan goals.

To the extent that WPI engineers turn these statements of personal value into action, the Plan has succeeded in producing the new breed of engineer—technological humanists who are sufficiently involved in the social, political, and cultural activities of the community to be able to bring their technological background in problem-solving to bear on vital issues.

In yet another study of the Plan, conducted under the auspices of the Exxon Educational Foundation, Dr. Lee Harrisberger stated, "There is little doubt that experience-based education creates a powerful learning environment which results in new . . . skills and attitudes which are important to practicing engineers."

In concluding his 1975 study, Dr. Lee Harrisberger stated, "Experiential learning works." In the same year, Dr. Cohen concluded, ". . . it seems fair to say that the program is beginning to succeed in terms of its original expectations or goals." In 1978, she added, ". . . the WPI Plan has been demonstrably effective at the undergraduate level." And in 1981, Dr. Bock concluded ". . . the Plan is achieving its central purpose of training 'technological humanists.' "

After ten years of evaluation, it appears to be safe to conclude that indeed, the WPI Plan is working.

Shannon T. Devoe, Ph.D., is a clinical psychologist who specializes in consulting to educational institutions. Formerly a research associate at Clark University, she is currently an advisor to WPI and the Southbridge (Mass.) Public School System. For more information on the results of the studies cited in this article, write the Editor, WPI Journal.

At WPI's world-famous Alden Research Laboratories, research is current and demanding.

students are consistently able to research and assess current—not merely "backburner"—issues. For the student, he believes, the experience provides a unique inside look at the "capital system," so that they mature quickly within the milieu of Administration policy and regulatory agencies. "WPI is one of, if not *the*, nation's leading programs in truly bringing students into the real world and testing them at the professional level," he says.

Other, non-residential project centers exist at Digital Equipment Company, St. Vincent Hospital, the University of Massachusetts Medical Center, and the Norton Company.

William Densmore, '45 ME, Senior Vice President for Engineering and Information Systems at Norton, sees it this way: Beyond the long-term benefits of contributing to the educational process and helping to build much needed bridges between business and academia, rewards to Norton include tangible product development and process improvement, fresh thinking injected into the company, expanded contact with faculty project advisors, and assistance in recruiting.

While off-campus projects provide unusual opportunities for both students and sponsors, they constitute only about 40 percent of the 1,100 projects conducted annually. Actually, says Lutz, most projects—MQPs and IQPs—are proposed not by companies, agencies or students, but by faculty as part of their research activities. Students can thus become junior colleagues on faculty research, often co-authoring papers and making presentations at research symposia, making a real contribution to knowledge in a specific field. The depth and logistics of each project experience, he explains, make it *very* difficult for students to develop projects on their own from scratch.

Currently, most off-campus IQPs are sponsored by non-corporate public and private agencies. Nothing surprising about this, says Demetry. The nature of corporations is to involve students on projects which affect the profit and loss statement—a natural fit for MQPs—while the mission of public agencies is to solve less technical, often human problems.

To bring the two worlds together, WPI's Issues Research Collaborative (IRC) has been formed to identify topics of in-

Looking Ahead:
A Conversation with the President

A recent talk with Dr. Edmund T. Cranch gave the Journal *an inside look at the kinds of issues facing the highest ranks of the nation's educators. Here are excerpts from that conversation.*

Journal: Dr. Cranch, what's ahead for higher education in the next decade? For many colleges and universities, it is certain there will be hard times. In technological and science education we are confronted by at least three fundamental issues. First, in the post-Vietnam era, we experienced a surge of anti-technology sentiment by some facets of society. While this has subsided, historically engineering education has been closely coupled with the state of the economy. The question is whether this historical pattern will continue in this decade. Second, we have entered an era in which expansion of federal support for higher education is being markedly curtailed. This will have a major impact on the financing of education for students in the 1980 s. Third, demographic shifts—the end of the baby boom leading to a lower birth rate—will make it more and more difficult for colleges to attract students to their doors. The pool simply isn't as deep as it was just a few years ago. Clearly, to remain competitive we must develop imaginative programs of exceptional quality and be more assertive in our recruiting efforts. As you are aware, we have been quite successful in this endeavor.

terest to *both* public and private groups. Several elements of IRC complement the usual project selection process: (a) the Executive Issues Policy Council, made up of representatives from industry, the Governor's office and other public agencies; (b) development of a computer-based information retrieval system; and (c) access to existing data bases and analytical resources, most notably the Massachusetts Economic Policy Analysis (MEPA) Model.

IRC topics, which lend themselves to both student and faculty research, address both long-term issues that will underlie future events in New England and beyond, such as human resource needs and energy transit impacts, and the implications of policies that affect these issues.

At Genrad Corporation, for instance, a WPI project team has examined the organizational and quality-of-life issues surrounding women's increasing participation in the job market. Questions regarding child care benefits for employees—both women and men—and regional differences in job participation rates across the nation are just two of the issues being investigated.

One can conclude from all this that a decade of project experience has done nothing if it hasn't uncovered more and more opportunities.

Frank Lutz is the first to admit that the projects program is not without its shortfalls. "It's expensive and can require a big chunk of faculty time in advising students." Maybe this is why lesser schools haven't been successful or even undertaken a project program that amounts to a quarter of the degree requirement. "Still, I think it's what sets us apart from the competition." Dean of Undergraduate Studies William Grogan '46, concurs, and sees the lack of universal visibility of final project reports—on- versus off-campus presentation—as the major hurdle blocking across-the-board top quality projects.

And what of the next decade of projects? "We'll be looking at a host of issues," predicts Lutz, such as trying to enhance the quality of projects, looking for new, creative relationships, examining the feasibility of getting research funding for undergraduate projects, exploring the appropriate outlets for the 3,500-plus project reports in Gordon Library. "We don't expect to be just sitting around asking whether this or that form should be revised."

Jim Demetry has an eloquent way of summing things up. "It'll take a whole collection of careers to measure the effects of the WPI Plan. The conventional wisdom holds that an engineering education has a half life of seven years at best. How do we prepare someone for 40 professional years through undergraduate courses alone? It's impossible, I believe. So we're better off concentrating on fundamentals and the *process* of organizing, attacking and analyzing problems. *This* is learning. We say this a lot, but it's not just lip service. We honestly believe the projects help accomplish this."

Since the Plan came along ten years before these developments, what kinds of questions are you asking regarding its relevance to today's challenges? We've got to examine closely whether the aspirations of students, faculty, and the Institute as a whole are being met and try to predict the future needs of these groups. For example, projects are very faculty-intensive. Good project topics and stimulating faculty advising don't just happen automatically. They take time and conscious effort to develop. We're constantly challenged to provide meaningful projects for our students. We've got to review and assess on a regular basis what distinguishes really good projects from mediocre ones, then try to foster the positive factors in the entire projects program.

The humanities sufficiency and the IQP—what's the status of their health? They're both doing well. It's true that the IQP can call no academic department its natural home. Hence, we must work hard to incorporate the IQP into the Plan so that in the future both students and faculty will feel it is a constructive learning experience.

The humanities sufficiency plays a vital role in the Plan. It acts as an undergraduate minor in non-technical fields, thus helping the Plan meet its objective of educating the humanistic technologist. Further, it gives the humanities department a meaningful stake in an institution whose primary purpose is science and technology. At many technological colleges this group of faculty takes on second-class status. Through the sufficiency and IQP work, WPI faculty in the humanities are given an opportunity to interact with students whose interests amplify their own. We're seeing some outstanding work in the humanities area.

What is the role of faculty research in a college whose primary mission is undergraduate education? It plays a key role. As you know, it's generally conceded that some research is vital in order that faculty remain current in their fields of specialization. Only by teachers staying at the forefront of their fields can their courses and curricula reflect the state of the art. A major issue confronting us today is finding ways in which research activities can be assimilated into the Plan. MQPs and IQPs are important factors here because they are in many cases a facet or segment of faculty research. To provide classroom and project experiences that are relevant and exciting to students, faculty must be aware of the cutting edge of their field. One feeds the other.

Small and mid-sized private colleges have always played a vital role in America's educational system. How will they—and specifically WPI—survive the severe difficulties ahead? The developments I mentioned earlier—economic and demographic shifts—will call into question the reputation for excellence enjoyed by these institutions. Ten years ago, in the face of other serious challenges to education, innovation kept WPI vital. While WPI has an outstanding track record—both before and since the Plan's inception—we must remain alert to ways in which we can further improve our approach. A trap into which some institutions may fall is a temptation to make quick fixes. WPI is extremely fortunate that its educational Plan is fundamentally sound and has had sufficient time for thorough implementation. Certainly, we are committed to maintaining our tradition of excellence. In spite of the demographic factors mentioned previously. I believe that engineering and science education will benefit from the technological and economic imperatives implicit in modern society. With the increasing demand for engineers and scientists in almost all sectors of our economy, I believe we are in a position of strength to weather the storms ahead. The creativity and resourcefulness that characterize our faculty give me confidence in our future vitality.

Getting a Job

The job market for graduating engineers and scientists has never been stronger. Engineers, for example, are in such great demand today that they receive the highest average starting salaries of all bachelor's degree recipients.

Bill Trask is Director of Graduate and Career Planning at WPI. In the past year, he says, well over 5,000 interviews were given by recruiters from more than 300 companies—an average of nearly ten for each graduating senior.

Trask has seen many a class go on to professional careers and graduate school. Even after graduation, his office can assist alumni seeking new employment or changing career paths.

"We see very impressive effects of the Plan during recruiting interviews," he says. "Our kids can get up on their feet and be articulate about their experiences here, especially about their projects. Our kids really open up."

Recruiters interviewed by the *Journal* couldn't agree more. Among them is Jack Marcil of General Electric Company. WPI students, he believes, "are better interviewers—more at ease, self-confident and articulate—than engineering students from other colleges." Projects, he says, come very close to real-life industrial experiences. And in professional teamwork situations, the MQP, coupled with the IQP, enables grads to understand the needs of and communicate ideas better with people outside the realm of technology.

Dr. Norbert Smith, of the Electric Boat Division of General Dynamics Corporation, believes scientists and engineers, perhaps more than other professionals, must exhibit resourcefulness and assertiveness. "Projects help provide the basis for these characteristics." He sees only one problem with the Plan: grading. In general, he believes employers have trouble understanding WPI's Distinguished/Acceptable system of grading. "Most recruiters find equating this two-tiered scheme with conventional A-B-C-D-F system something of a hassle."

GE's Marcil mirrors Smith's concern for this anomaly, as does Ken Keane of the Torrington Company, a leading maker of bearings. "But this doesn't create a stumbling block in seeking WPI hirees," he says. WPI students, he adds, seem to gain a broader background than those he visits at conventional technological colleges.

John Zifcak, '65 PH, now Section Manager, Science and Engineering Research Department at Foxboro Company, Foxboro, Mass., has seen the company hire several students who'd done projects at Foxboro. "They possess a certain intangible quality," he says. They come in with a maturity that other grads, who haven't gotten out of the classroom, don't enjoy. "It gives them a leg up on the competition."

An Alumni Omnibus

BEING A COLLECTION OF THOUGHTS ON THE PLACES AND WAYS THE MIND GETS HONED.

Photography by
William Denison

The hand is the cutting edge of the mind.

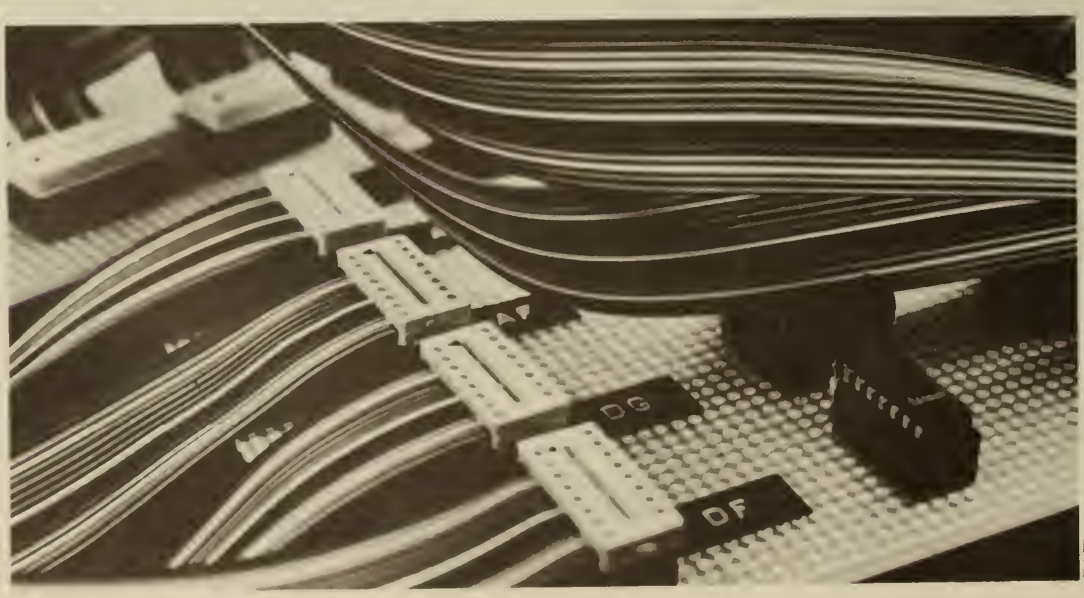
—JACOB BRONOWSKI

Education is a weapon, whose effect depends on who holds it in his hand and at whom it is aimed.

—JOSEPH STALIN

It is well to observe the force and virtue and consequence of discoveries, and these are to be seen nowhere more conspicuously than in printing, gunpowder, and the magnet. For these three have changed the whole face and state of things throughout the world, . . . in so much that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical discoveries.

—FRANCIS BACON



Ed Thorsett

I have yet to see any problem, however complicated, which, when you looked at it in the right way, did not become still more complicated. —POUL ANDERSON

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back. I am sure that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas. Not, indeed, immediately, but after a certain interval; for in the field of economic and political philosophy there are not so many who are influenced by new theories after they are twenty-five or thirty years of age, so that the ideas which civil servants and politicians and even agitators apply to current events are not likely to be the newest. But, soon or late, it is ideas, not vested interests, which are dangerous for good or evil.

—J.M. KEYNES

Our universities have become the research and training centers on which American defense and industry and agriculture and the professions depend. Our progress in all these fields depends upon a constant flow of high-caliber and skilled manpower, upon new ideas and the ability to apply those skills. Thus, today, the university is, in the words of Woodrow Wilson, "the root of our intellectual life as a nation."

—JOHN F. KENNEDY

There is the greatest practical benefit in making a few failures early in life.

—THOMAS HUXLEY

Which would have advanced the most at the end of a month—the boy who had made his own jackknife from the ore which he had dug and smelted, reading as much as would be necessary for this,—or the boy who had attended the lectures on metallurgy at the Institute in the meanwhile, and had received a Rogers' penknife from his father: Which would be most likely to cut his fingers?

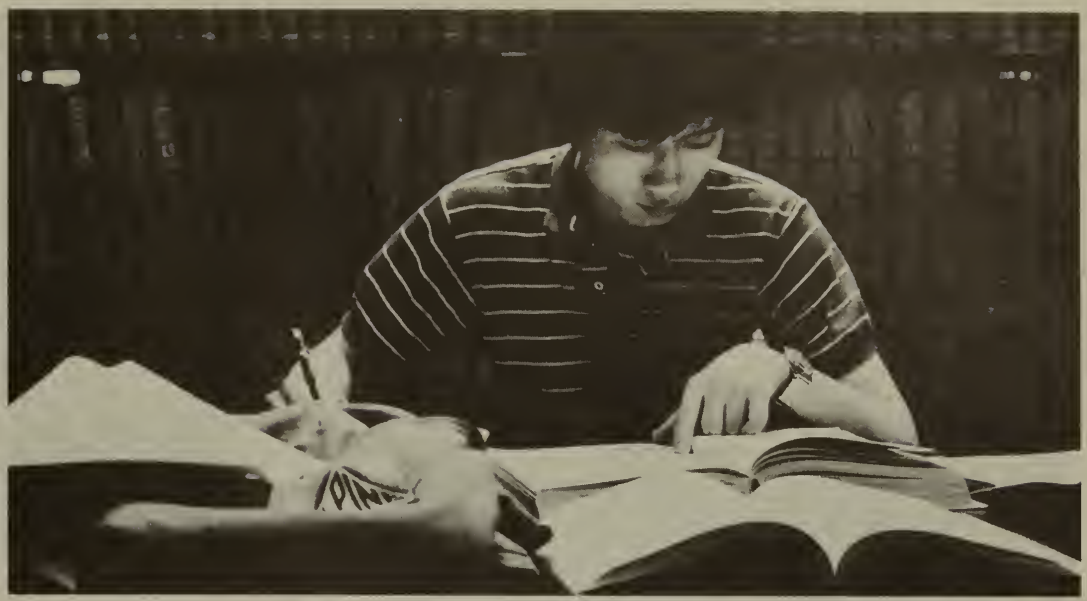
—HENRY THOREAU

The ends are achieved by indirect means—something said in private conversation one day in the street, a remark made by a teacher in the middle of a discussion, a book picked up in someone's room . . . .

—HAROLD TAYLOR

Take no thought for the morrow. Live neither in the past nor in the future, but let each day's work absorb your entire energies, and satisfy your widest ambition. . . . The student who is worrying about his future, anxious over the examinations, doubting his fitness for the profession, is certain not to do so well as the man who cares for nothing but the matter in hand, and who knows not whither he is going!

—WILLIAM OSLER



When he has learnt that bottinney means a knowledge of plants, he goes and knows 'em. That's our system, Nickleby; what do you think of it?

—CHARLES DICKENS

I learned three important things in college—to use a library, to memorize quickly and visually, to drop asleep at any time given a horizontal surface and fifteen minutes. What I could not learn was to think creatively on schedule.

—AGNES DE MILLE

The body of an athlete and the soul of a sage; these are what we require to be happy.

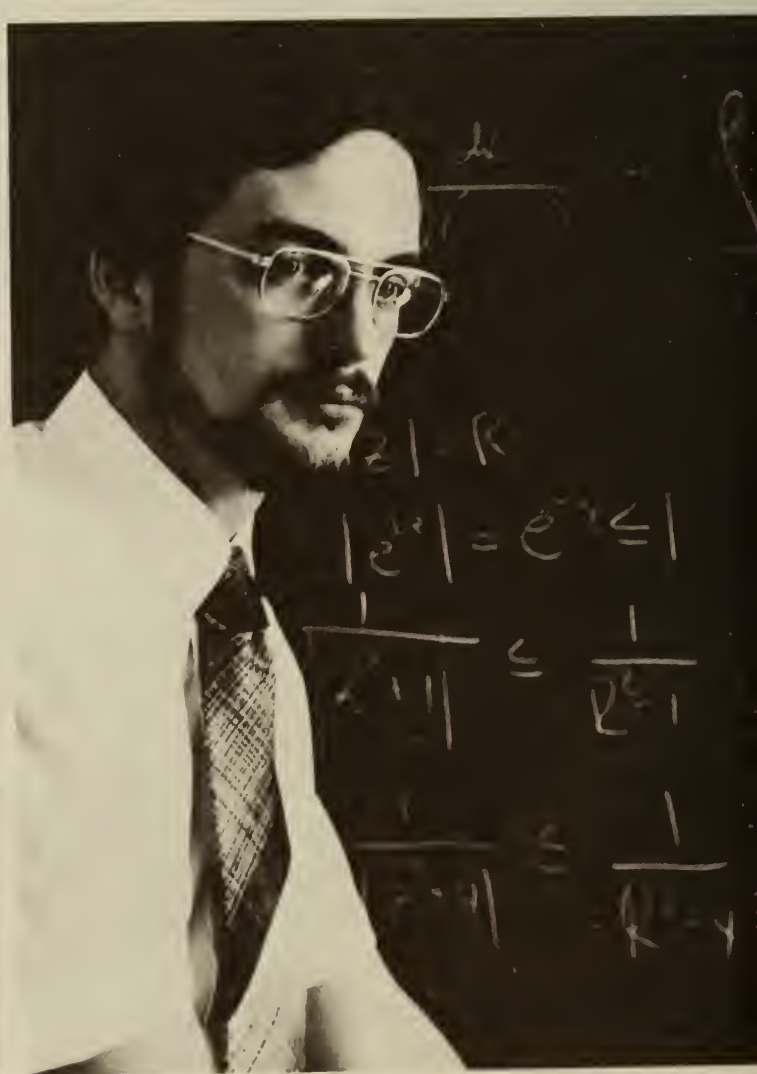
—VOLTAIRE

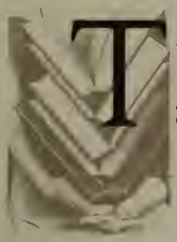
It is the attitude of mind developed in the student as he proceeds with his studies, and not primarily the information he acquires, which determine the character and extent of his education.

—LUTHER EISENHARDT

This is the age of knowledge, more of which has been established than in the whole recorded past. It has developed so rapidly that we are no longer at all sure of what we know. We can take no comfort in the belief that what appears to be the whole truth will be the whole truth tomorrow.

—BARNABY KEENEY



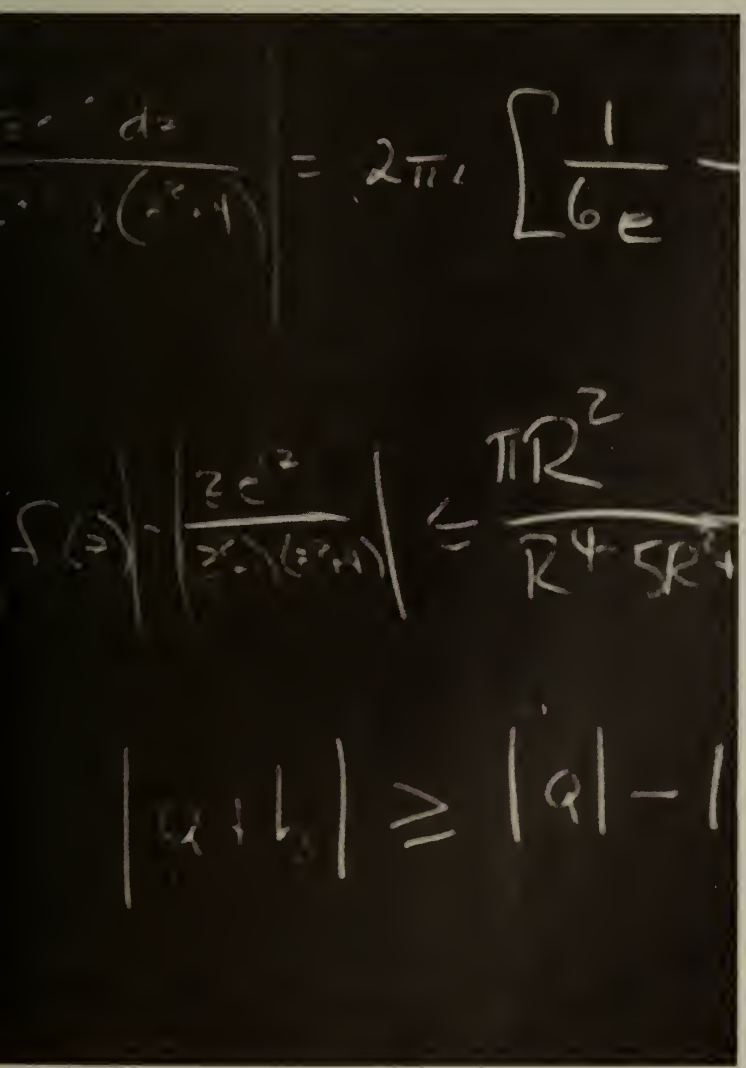


Two sorts of truth: trivialities, where opposites are obviously absurd, and profound truths, recognized by the fact that the opposite is also a profound truth.

—NIELS BOHR

Few of us take the pains to study the origin of our cherished convictions; indeed, we have a natural repugnance to so doing . . . .The resentment aroused when doubt is cast upon any of our assumptions leads us to seek every manner of excuse for clinging to them. The result is that most of our so-called reasoning consists in finding arguments for going on believing as we already do.

—J. H. ROBINSON



It's not the least of the functions of a true university to maintain a climate favorable to the growth of new ideas and novel practices, and then sit back and see what happens. In such a climate, weeds spring up along with wholesome new plants. Where weeds won't grow, nothing will grow. Trustees and visiting alumni . . . are apt to see the weeds and yearn to fly at them with a hoe. That would be dangerous because it's hard to tell at first which is the weed!

—ROMEYN BERRY

Every good laboratory consists of first-rate men working in great harmony to insure the progress of science; but down at the end of the hall is an unsociable, wrong-headed fellow working on unprofitable lines, and in his hands lies the hope of discovery.

—LORD RUTHERFORD

It ain't the things we don't know that hurt us. It's the things we do know that ain't so.

—ARTEMUS WARD

For God's sake, stop researching for a while and begin to think.

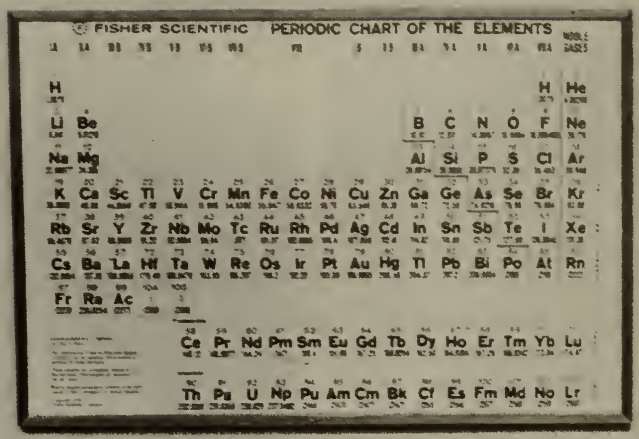
—WALTER HAMILTON MOBERLY

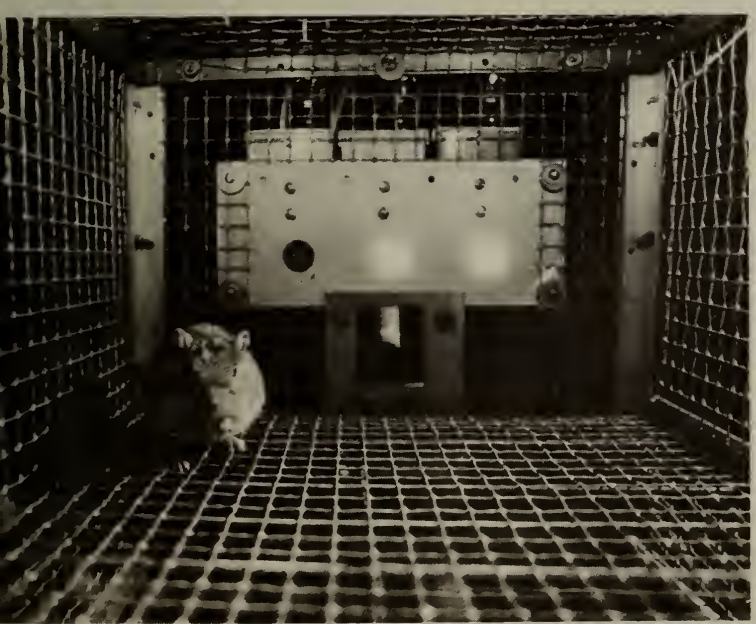
Do you wish to learn science easily? Then begin by learning your own language.

—ÉTIENNE BONNOT

Here is the world, sound as a nut, perfect, not the smallest piece of chaos left, never a stitch nor an end, not a mark of haste, or botching, or second thought; but the theory of the world is a thing of shreds and patches.

—RALPH WALDO EMERSON





To arrive at the simplest truth, as Newton knew and practiced, requires *years of contemplation*. Not activity. Not reasoning. Not calculating. Not busy behavior of any kind. Not reading. Not talking. Not making an effort. Not thinking. Simply *bearing in mind* what it is one needs to know. And yet those with the courage to tread this path to real discovery are not only offered practically no guidance on how to do so, they are actively discouraged and have to set about it in secret. . . .

—GEORGE SPENCER BROWN

Animals studied by Americans rush about frantically, with an incredible display of hustle and pep, and at last achieve the desired result by chance. Animals observed by Germans sit still and think, and at last evolve the solution out of their inner consciousness.

—BERTRAND RUSSELL

If we begin with certainties, we shall end in doubts; but if we begin with doubts, and are patient in them, we shall end in certainties.

—FRANCIS BACON

When a thing was new people said, "It is not true." Later, when its truth became obvious, people said, "Anyway, it is not important," and when its importance could not be denied, people said, "Anyway, it is not new."

—WILLIAM JAMES

Ed Thorsett

One hears a good deal nowadays of the hostility between science and technology. I don't think that is true, gentlemen. I am quite sure that it isn't true, gentlemen. It almost certainly isn't true. It really can't be true. . . . They have nothing whatever to do with one another.

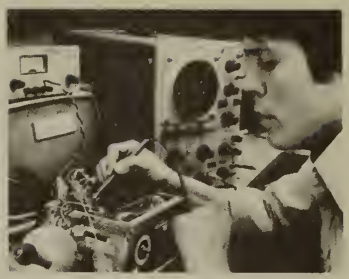
—DAVID HILBERT

The Stone Age may return on the gleaming wings of Science.

—WINSTON CHURCHILL

Engineering . . . is the art of doing that well with one dollar, which any bungler can do with two after a fashion.

—ARTHUR M. WELLINGTON



The habit of apprehending a technology in its completeness: this is the essence of technological humanism, and this is what we should expect education in higher technology to achieve. I believe it could be achieved by making specialist studies the core around which are grouped liberal studies which are relevant to these specialist studies. But they must be relevant; the path to culture should be through a man's specialism, not by-passing it. . . . A student who can weave his technology into the fabric of society can claim to have a liberal education; a student who cannot weave his technology into the fabric of society cannot claim even to be a good technologist.

—ERIC ASHBY

Richard Linfield

The adventurous student will always study classics, in whatever language they may be written, and however ancient they may be. For what are the classics but the noblest recorded thoughts of man? They are the only oracles which are not decayed, and there are such answers to the most modern inquiry in them as Delphi and Dodona never gave. We might as well omit to study Nature because she is old.

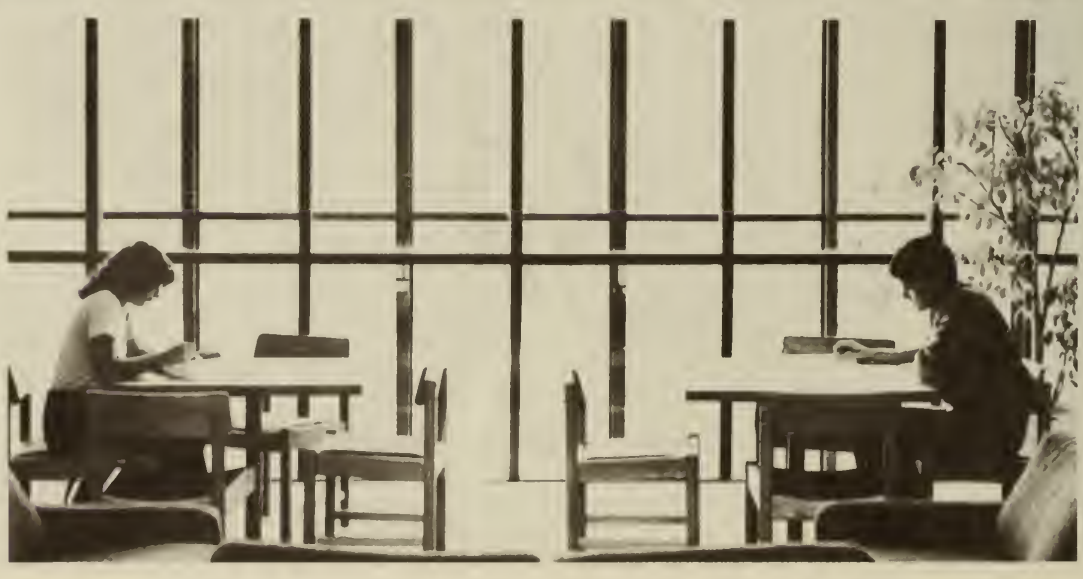
—HENRY THOREAU

Knowledge is one. Its division into subjects is a concession to human weakness.

—HALFORD JOHN MACKINDER

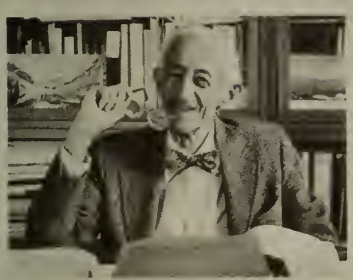
Books won't stay banned. They won't burn. Ideas won't go to jail. In the long run of history, the censor and the inquisitor have always lost. The only sure weapon against bad ideas is better ideas.

—WHITNEY GRISWOLD



The first rule of intelligent tinkering is to save all the parts.

—PAUL EHRLICH



It is not so important to be serious as it is to be serious about the important things. The monkey wears an expression of seriousness which would do credit to any college student, but the monkey is serious because he itches. —R.M. HUTCHINS

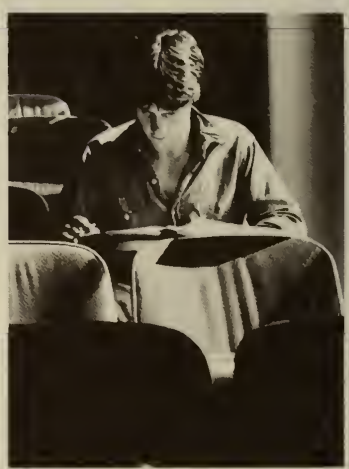
A man doesn't learn to understand anything unless he loves it.
—GOETHE

Asked if he could summarize the lessons of history in a short book, Charles A. Beard said he could do it in four sentences:

1. Whom the gods would destroy, they first make mad with power.
2. The mills of God grind slowly, but they grind exceedingly small.
3. The bee fertilizes the flower it robs.
4. When it is dark enough, you can see the stars.

There is nothing more notable in Socrates than that he found time, when he was an old man, to learn music and dancing, and thought it time well spent.

—MONTAIGNE



Whatever gains we may make in our material condition, whatever limitations are still obvious, let us not forget, my friends, that men and methods make universities, not halls, nor books, nor instruments, important as these are.

—DANIEL COIT GILMAN

Ed Thorsett

To know only one thing well is to have a barbaric mind: civilization implies the graceful relation of all varieties of experience to a central humane system of thought. The present age is peculiarly barbaric: introduce, say, a Hebrew scholar to an ichthyologist or an authority on Danish place names and the pair of them would have no single topic in common but the weather or the war (if there happened to be a war in progress, which is usual in this barbaric age).

—ROBERT GRAVES

Education is . . . hanging around until you've caught on.

—ROBERT FROST

WPI CLASS NOTES

WPI Alumni Association
President, Peter H. Horstmann, '55
Senior Vice President,
Clark L. Poland, '48
Vice President,
Harry W. Tenney, Jr. '56
Secretary-Treasurer,
Stephen J. Hebert, '66
Past President, John H. McCabe, '68

Executive Committee members-at-large
Henry P. Allessio, '61; Philip B. Ryan, '65; Donald E. Ross, '54; Anson C. Fyler, '45

Fund Board
Henry Styskal, Jr. '50, chair; Richard B. Kennedy, '65, vice chair; Gerald Finkle, '57; Allen H. Levesque, '59; Philip H. Puddington, '59; Richard A. Davis, '53; C. John Lindegren, '39; John M. Tracy, '52

1912

MARRIED: Norma Larson, honorary member of the Class of 1912 and former director of records and services at WPI, to Richard Quinzani in Worcester on July 10, 1982.

Norma, the unofficial first lady of the Alumni Office for 30 years, has been a friend to hundreds of alumni and their families. In 1976, she was the first WPI woman staff member to be tapped for Skull. In 1977, she left WPI to go into private business. Currently, she is with Ben Bousquet Gallery of Homes, Worcester.

Dick, a registered professional engineer, holds a BSEE from the University of Massachusetts, Amherst. He has been a project liaison engineer for Boston Edison on WPI projects, participating in a number of MQPs and IQPs. A past chairman of the Boston Chapter of the Power Engineering Society (PES), he is now the Northern Region I Chapter representative from the Boston, Worcester County and Manchester (NH) chapters to the national PES Council. He is a member of the IEEE.

1917

Dick Daniels writes that he still has his amateur radio license, although he seldom transmits. He started out in "wireless" in 1908, four years before the government required exams and "put us all where it decided it would be difficult to send beyond state boundaries. That backfired, because we were still able to talk around the world." Dick and his wife live in South Yarmouth and enjoy the Cape.

Art Gorman, who was unable to attend reunion, was slated to be in New England in late August. During his career, he was a sanitary engineer for the U.S. Public Health Service, worked on Chicago's water problems and ended up with the Atomic Energy Commission before retirement.

At 88, **Bob Hanckel** continues keeping up his garden and grounds in Scituate, MA. "My son, Stuart, lives right next door to keep a watch over my doings." Since Betty passed away, he has rented part of his big house so that he can have company.

Mac Mackenzie and his wife live a quiet life, with some travel, in Spartanburg, SC. Mac likes gardening and tinkering in his woodshop. They have two children and seven grandchildren, scattered from Cleveland, Ohio, to South Carolina. Mac was unable to attend the 65th class reunion.

The **Louis Jacobys** recently celebrated their 50th wedding anniversary. Their son, Robert, lives near them so they often see their four grandchildren. Although Jacoby retired ten years ago, he walks about a mile every day to a branch office of Bache & Co. to meet with friends and watch the stock market reports.

Last spring, **Earle Pierce** fell and hurt his back. He spent three weeks in the hospital, "with nurses around the clock." Once out of the hospital he recuperated at his cousin's house. His wife passed away in March. Earle lives in Middlebury, CT.

Brig. Gen. **Hermon Safford,** Ret., resides in La Jolla, CA, with his wife Annemarie. Hermon has two children, five grandchildren and three great-grandchildren. He was sorry to miss his 65th reunion, "but 3000 miles is a pretty long haul for an old-timer."

Frank Swallow says that after 42 years with the U.S. Envelope Company, he retired in 1959 and moved to DeBary, FL, "a pleasant, peaceful community." He and his wife have been married for 64 years. Their daughter and grandson and family live only 30 miles away in Daytona Beach.

Jack Wheeler, who lives in West Mystic, CT, still sails his 35-ft. sloop and plays golf. For the past six months, his wife has been ill, but since their children and their families live nearby, he planned to attend the reunion luncheon.

Betsy and **Laurence Wood** of Columbus, OH, recently spent nearly six months in Florida. Says Larry, "We have enjoyed 57 years of happy married life."

1922

Howard Carlson writes he was unable to attend his 60th reunion, but recalls when he and several other WPI students residing in a rooming house saved a mother and child overcome by gas fumes. "We called ourselves the 'Gas House Gang' after that near-fatal event, and as alumni we often got together on a yearly basis."

Charles Clarkson from California could not attend the reunion either. He has warm memories of "two of the finest teachers that I ever met, Dr. Masius and Dr. Morley." According to Clarkson, they could solve problems both inside and outside the classroom.

George Walker, WPI trustee emeritus, was unable to make reunion because of his busy schedule, but alumni activities have been "almost a full-time extracurricular program for 50 years." In 1962 he received the Taylor award for distinguished alumni service to WPI. He still walks four miles a day or pedals 20 miles a day on his exercise bicycle.

1927

Mr. and Mrs. **Richard Bliven** observed their 50th wedding anniversary in September of 1981.

While his 55th reunion was taking place at WPI, Dr. **Richard Irons** was receiving a silver bowl during Prize Day ceremonies at Groton (MA) School in recognition of his 50 years as school tennis coach. While he was coach, Groton teams won 55 of 58 matches between 1967 and 1972 and had 20 straight years of winning seasons, from 1962 to 1982.

1930

Ed Delano, who at 77 still rides his bicycle for pleasure and competition (up to 5,000 miles per year), rode for the benefit of the CROP Pedal Push Over Hunger held in Davis, CA, in May.

1931

Frederick Farrar was recently named a Paul Harris fellow by the Keene (NH) Rotary Club. The honor recognizes significant community service and affiliation with the Rotary Foundation, an organization connected with the Rotary Club that furthers international understanding. Farrar, who founded Frederick A. Farrar, Inc., of Keene, has been active in

Scouting for many years. He was an original member of the President's Advisory Council at WPI.

1935

Al Moran is enjoying retirement pursuing his hobbies, studying genealogy and serving as treasurer of the local AARP chapter. Formerly he was with what is now the Organic Chemicals Division of American Cyanamid, Bound Brook, NJ.

John Molloy is retired and living with his wife, Doris, in Tucson, AZ. They have six children and several grandchildren. Previously, Molloy was a long-time employee of the U.S. Geological Survey, Water Resources Division. In 1974 he was listed in *Who's Who*.

Ted Swan serves as an alternate Dad in his local Boys' Club program called B.U.D. (Boys Under Direction). The program is supervised by the New York State Redevelopment Center. Says Swan of his particular "son," "We spend up to 16 hours a week together."

1936

Mr. and Mrs. **Roger Bruce** of Worcester were honored in April on their 40th wedding anniversary at a reception given in their home by their family. They have five children and two grandchildren. Bruce is retired from the former American Steel & Wire Co. and is vice president of Persons-Majestic Mfg. Co.

Alexander Gordon, research director for Vellumoid, Inc., Worcester, has been named a 1982 recipient of the Award of Merit by the international standards-writing organization, ASTM. During the awards ceremony in Charleston, SC, in April, he was cited for 18 years of active service on ASTM gasket committees. Gordon, who was the first member of (gasket) Committee F–3 to receive the Award of Merit, is now a fellow of ASTM.

1939

E. Bruce Crabtree has been named vice president of sales at Bryant Grinder Division of Ex-Cell-O in Springfield, VT. He joined Bryant in 1974 as manager of sales and service. The following year he was named general sales manager.

Chester Ferguson, Jr., retired as a senior engineer for Boeing Co., Renton, WA, last year.

Charles Thulin, formerly a department head at Bell Labs, is retired and living in Matawan, NJ.

1940

Frank Delany retired in July of 1981. He had been with Hazeltine Corp. of Greenlawn, NY.

Judson Lowd was a featured speaker at the Hancock Bank Sixteenth Annual Economic Symposium held in Biloxi, MS, in February.

Herbert Shaw, Jr., who headed American Re-Insurance Company's facultative division for the past 13 years, has retired. Shaw joined the New York firm in 1963 after wide experience in the industry since 1948.

1941

William Bowne has retired from D/B/A Aeroconomy Agency as a manufacturing engineering representative. He is located in Schenectady.

Alexander Chodakowski is self-employed in Oxon Hill, MD. He has a PhD from the University of Illinois.

In February **F. Warren Crowley** took early retirement from Alexander & Alexander, Inc. He has moved to Whiting, NJ.

R. Keith McIntyre is a self-employed data processing consultant in White Plains, NY.

Richard Ramsdell works as a senior project engineer at Parker Seal Co., Culver City, CA. The company is a subsidiary of Parker-Hannifin Corp.

William Wiley holds the post of division engineer at Master Builders, a division of Martin-Marietta in Woburn, MA.

1942

E. Curtis Ambler has retired as captain of the Newington (CT) Volunteer Fire Dept. after 35 years of service. He has been a fire-engine buff since his youth, and his wife says of his retirement, "I wonder who'll fix the trucks now when they won't start?" Ambler is vice president in charge of R&D in the industrial hardware division of The Stanley Works.

Philip Camp continues as principal of Philip L. Camp Assoc., Inc., Ft. Pierce, FL.

1943

Continuing with the Hose Product Division of Parker-Hannifin Corp., **William Currie** is currently a chief staff engineer for the firm in Wickliffe, OH.

Harry Merkel is president of Mercury Co. of Norwood, Inc., Brockton, MA, a subsidiary of Fischbach Corporation.

1944

Hal Blake has been an hydraulic engineer with the Bergen County (NJ) Department of Public Works since 1969. Previously, he had been assitant town engineer in Bloomfield, NJ, and had been affiliated with Tippetts-Abbett-McCarthy-Stratton in New York City, where he enjoyed numerous overseas stints. Hal and his wife, Marge, are looking forward to retirement in their passive solar home in North Carolina.

For the past 15 winters, **Sherm Campbell** has served as a volunteer National Ski Patrolman near his home in Perry, NY. Sherm holds the post of R&D manager with Champion Products and travels coast to coast "endeavoring to excel in screen printing on athletic and campus sportswear." Earlier in his career, he worked on development of the first atomic submarines and has a patent on design of the Nautilus, plus five other design patents.

Irving James Donahue, Jr., of Shrewsbury, MA, a WPI trustee, continues as president of Donahue Industries, Inc. and Donahue International, Inc. His company has a product line of more than 400 parts used by grinding-wheel manufacturers and users. Before starting his own business in 1957, he had been with Carlstrom Pressed Metal, Westboro, Reed & Prince Mfg. Co. and American Steel & Wire, Worcester. He holds an MBA from Harvard Business School and has been selectman in Shrewsbury, as well as a local finance committeeman, president of the Central Mass. Employers Assoc. and governor of the Worcester Country Club. A past president of the WPI Alumni Association, he received the Stephen Salisbury Award from the WPI trustees and the Herbert F. Taylor Award from the WPI Alumni Association.

Blitz Krieger is still a nuclear weapons designer for Sandia Laboratories, Albuquerque, NM, at their branch lab. in Livermore, CA. Once he spent 13 months in Washington, DC, as a technical consultant to the Arms Control and Disarmament Agency on Project Cloud Gap, a test of a proposed treaty with the Russians on dismantling nuclear weapons. After hours, Blitz is involved with the Episcopal Church and bird-watching.

Erling Lagerholm is currently a real estate counselor with Norwood Group International, Inc., in Bedford, NH. Previously he was with Cabot, Cabot & Forbes Co., American Appraisal Co., Thomas F. McSweeney Associates and Exxon Research and Engineering Co. Some Lagerholm highlights: "Crossed the Atlantic to Cowes, England in a 50-ft. sloop; dated Ronald Reagan's daughter, Maureen, in London; and visited Berlin before 'the Wall.'" In 1979 he married Emilie Hofmann and "took on one wife, four kids, two cats and one dog." The newlyweds honeymooned by climbing Mt. Olympus in Greece and cruising around the Aegean Islands.

Since 1967, **William Raymond, Jr.,** has served as chief traffic engineer for Gannett Fleming Corddry and Carpenter, Inc., Harrisburg, PA. During the past 13 years he has flown over 250,000 miles for the firm, including tours in Guatemala, Ecuador, Cameroon, Israel and Thailand, as well as to numerous U.S. cities. He has been a member of the ASCE Committee on Geometrics of Highway Design since 1965. He was named president of the Central Pennsylvania Section of the ASCE in 1972 and Master of his local Masonic Lodge in 1974. For 25 years he has sung with his church choir and for three years with the Harrisburg Choral Society.

Wallace Underwood is now designing underwater test equipment with Sippican Ocean Systems in Marion, MA. A founder of the WPI Sailing Association, he is ex-commodore of the Manchester (MA) Frostbite Association, a member of the Corinthians ocean racing club, Beverly Yacht Club and a senior member of the U.S. Power Squadrons. Also interested in amateur theater, he has served on the board of directors and been production manager of the Monmouth (NJ) Players. A graduate of the Rhode Island School of Design, Wally formerly designed refrigerators for Westinghouse, ran a product-design consulting business in

Boston and managed product development and plastics research with American Can. He has designed about 100 familiar manufactured products, as well as his own passive solar home.

1945

Robert Edgerly is employed as a group leader of operations at Grumman Aerospace Corp., Bethpage, NY.

John Hyde, senior vice president of the chemical unit of Diamond Shamrock Corporation, retired in August following 30 years of service. He entered the chemical industry immediately after World War II. During his career at Diamond Shamrock, he advanced to division operations manager, division manager and senior vice president. He served in the U.S. Navy.

Still with Cincinnati Milacron-Heald Corp., Worcester, **Donald MacKay, Jr.,** is now manager of advertising and product promotion.

1946

Robert Bartlett serves as manager of refrigeration engineering for Babson Brothers Co., Oak Brook, IL.

Alpheus Farnsworth is affiliated with Gregory Group, Inc., North Bergen, NJ.

William Grogan, dean of undergraduate studies at WPI, was guest speaker at the Hudson (MA) Rotary Club annual banquet for National Honor Society members of local Hudson schools last spring.

William Jaegle is president of Marketing Technology, Inc., Calabasas, CA.

Allan Johnson has been elected to a four-year directorship of Kemper, S.A. and a one-year term as director of Kemper International Insurance Company. He joined Kemper in 1964 to establish the firm's HPR department. He has been directing the activities of the national-international department. He serves as HPR officer for Kemper's principal insurance companies and senior vice-president and director of American Protection Insurance Company. A member of the Society of Fire Protection Engineers, Johnson is also a registered professional fire protection engineer in California.

1947

Jacques Metenier holds the position of chairman of the board of Delas Weir, an international company located in France, which is concerned with the optimization of condensers, feed water heaters and heat exchangers. The firm is first in its field in Europe.

1948

Louis Block and his son, Richard, are now in the wholesale and importing business of candy and toys. He writes: "We are moving this month into our new 60,000 sq. ft. warehouse." Block, who remarried five years ago, says that he has seven children between the ages of 1 and 31.

Milton Bradley's Idea Man Retires

If your youngsters put a Pac-Man board game, a Smurf card game or the ever-popular electronic game, Simon, on their Christmas lists, you can thank Jim Houlihan, '42, who retired in June as vice president of R&D at Milton Bradley Co., East Longmeadow, MA.

As his career with MB began to unfold nearly 40 years ago, Houlihan never dreamed he'd become the firm's chief idea man. "I wanted to be a chemical engineer," he says. "Following World War II, I joined MB's art department developing crayons. Before long, I transferred over to R&D when I discovered I was more interested in making games than making crayons."

For Houlihan the move was a good one. Developing new games is big business, and he has the knack of knowing what the game players of the world want. What's the hottest name in arcades today? Pac-Man, of course. And MB had the foresight to snare the contract to produce the Pac-Man board game, which should be a hit come Christmas.

What's more, before any other toy company was interested, MB picked up the rights to produce the little people known as Smurfs. Currently, "The Smurfs" is TV's most widely watched Saturday morning cartoon show, and spin-off games are now in the works.

Houlihan also helped bring out such trendy games as Electronic Stratego, Dark Tower, Domination, Knock Knock, and The Fall Guy—all part of Milton Bradley's latest line of best-sellers.

"I was responsible for riding herd on the staff as they created new games, toys and puzzles," he reports. "At the time of my retirement, there were 80 employees developing non-electronic games and 80 more working on electronic versions."

Because the game market is so competitive (another firm pirated ideas from MB's Simon and called their toy Copy Cat), Milton Bradley has a locked security wing, opened only to those who know a secret code. Jim Houlihan, of course, knows that code and a host of MB trade secrets.

With his inside knowledge, did he have to go through a debriefing program when he left Milton Bradley?

He grins. "I guess we have some sort of program like that."

Frederick Curtis, Jr., holds the position of vice president of General Dynamics, Ft. Worth Division.

Bob Hubley, who recently retired as a division manager for Western Union in Washington, DC, is now involved with video advertising and videotaping weddings, anniversaries, birthdays and reunions. He also has made several videotapes for entertainers for use in presenting acts to prospective employers.

Richard Seagrave holds the post of vice president of operations at J. I. Case Co., a division of Tenneco, Inc., in Racine, WI.

1949

Dean Amidon, District One highway engineer for the Massachusetts Department of Public Works, was recently elected president of the Northeast Association of State Highway and Transportation Officials (NASHTO). The association covers the six New England states, Delaware, Maryland, Pennsylvania, New York, the District of Columbia, Puerto Rico, the Virgin Islands and several provinces in Canada. Amidon, a DPW employee for over three decades, is a former state commissioner of public works and vice president of NASHTO.

Richard Coughlin has been elected vice president of Boston Edison Company. He will head the new procurement, stores and service organization. He has been director of the stores and service departments since 1972. A registered professional engineer in Massachusetts, Coughlin joined Boston Edison in 1949.

Henry Ezen says that he is a part-time tour guide for skiing trips in New England. Since 1970 he has skied and hiked twelve times in the Alps. He plans to continue hiking and skiing in the Alps as a tour guide for travel agencies.

In May, **Charles Gerber** was honored at a retirement reception at Mitchell College in New London, CT. A graphic science teacher at the college, he had participated in 30 of Mitchell's 38 commencement programs. Several years ago he retired from the Naval Underwater Systems Center. During his early retirement, he served as a full-time member of the college maintenance staff, while continuing to teach in the engineering division. He has been responsible for training an entire generation of draftsmen at Electric Boat.

John Hunter has been promoted to assistant general manager-engineering at General Dy-

namics' Electric Boat Division, Groton, CT. With the firm since 1949, he has held various engineering management posts. He is a registered professional engineer in Connecticut and the state of Washington.

Robert Quattrochi was recently reelected president of the Country Club of Pittsfield, MA. He is president of Pete's Chrysler-Plymouth, Inc., past treasurer of the Massachusetts State Auto Dealers Association and chairman of the National Subaru Dealer Advisory Council.

Joseph Skidmore serves as a sales engineer in the construction products division at Armco Steel, Tacoma, WA.

1950

Lawson Hill, Jr., holds the post of president of British Isles Collection, North Conway, NH.

John Orcutt has been named director of research and development of the Air Correction Division of UOP, Inc., Norwalk, CT. The division designs and manufactures air pollution control systems and equipment. Before joining UOP, Orcutt was manager of process development at Stauffer Chemical Company. He holds a PhD in chemical engineering from the University of Delaware.

Besides working full time in system engineering at Calspan Corporation, **Hugo Radt, Jr.,** also teaches courses in flight dynamics and vehicle dynamics and control at the State University of New York at Buffalo.

Tejinder Singh is now general manager of supplies and distribution with Bharat Petroleum Corporation in Bombay, India. He writes: "Our daughter and her husband, who live in the U.S., recently had a baby girl." His address is: Flat No. 32, 1A S.K. Barodawala Marg, Bombay 400–026, India.

Robert Stewart, a WPI trustee, has been elected executive vice president of corporate planning and development at IC Industries, Inc., Chicago. He joined the company in 1979 as senior vice president of corporate planning and development and is also a member of the Management Policy Committee. Most recently, he had been president of Arlen Realty Corporation, New York City.

1951

Leon Bassett holds the post of director of international operations for Skil Corp., Chicago.

William Haslett, Jr., works as an engineering specialist at Fisher Controls, Marshalltown, IA.

Robert Ripley holds the post of new products engineering manager of extrusion at Carlon, Cleveland, OH.

1952

Daniel Bernatowicz is headquartered in Cleveland, OH, as chief of the power systems branch at NASA Lewis Research Center.

Donald Krauss is now program manager for Raytheon in Portsmouth, RI.

A. Theodore Ponds is the current sales manager of Armco Autometrics in Boulder, CO.

1953

Henry Burger serves as manager of hotel services for Colonial Williamsburg Foundation, Williamsburg, VA. Formerly he was a commander with the U.S. Navy.

Currently, **Jack Schmid** works as a plant engineer for Great Lakes Chemical Corporation (Velsicol Chemical Corp.) in El Dorado, AR. The company products are related to bromine and used to make medicines, flame retardants, agricultural pesticides and fungicides.

Paul Snyder, Jr., holds the position of venture technical manager at Mobil Technical Services, Inc. He is headquartered in New York City.

1954

Joseph King is an assistant professor at Vermont Technical College, Randolph Center, VT.

Donald McEwan, president of the ITT Avionics Division, Nutley, NJ, was feted as "Man of the Year" by the American Institute of Aeronautics and Astronautics' North Jersey section at its annual award dinner in Clifton. He was selected for the award for his role in leading the ITT division in its acquisition of two highly competitive defense contracts in 1981 (representing a potential of $2 billion in production business for North Jersey over the next decade). McEwan has spent his entire career at ITT Avionics in New Jersey.

Wesley Wheeler's firm, Wesley D. Wheeler Associates, Ltd. (International Maritime Consultants), New York City, has been named eastern regional sales representative for Wartsila diesel heavy fuel engines. Wheeler reports that the Finnish Wartsila Vasa diesel is the only medium-speed unit designed from the bed plate up to burn only heavy fuel and operate at low load or idle for long periods of time. For nearly a decade Wheeler's staff of naval architects and marine engineers has provided a range of services to the marine industry, including vessel construction, conversion and modification plans.

1955

Kirby Ducayet, III, is staff vice president at Kimberly-Clark Corp., Neenah, WI.

Geza Ziegler: A Voice For Freedom

In 1957, after the Soviets tightened their grip on Hungary, Geza Ziegler, '59, a Hungarian student at Budapest Polytechnic Institute, fled to the United States. He entered WPI, where he later received both his BSEE and MSEE.

Away from the nightmare of Soviet domination, Ziegler became a willing participant in the American dream, which he viewed as the right to define personal goals, the right to pursue those goals and the right to receive recognition for personal success. In May, he was elected a fellow of the Bridgeport (CT) Engineering Institute (BEI), the highest internal honor bestowed by the Institute.

Ziegler, who has also been named director of the Danbury branch of the evening college, has been with BEI as an instructor and administrator since 1963. His fellowship award cited him for his "long, honorable and selfless service to the students, faculty and administration."

It also stated: "Geza Ziegler is an excellent example of the advantages afforded by the U.S. to its newly adopted citizens. However, such opportunities are only attainable by those who know how to grasp and use them."

During his 19 years with BEI, Ziegler has served as assistant chairman of mathematics, dean of the faculty of the Stamford branch and dean of college extension. In his capacity of dean of college extension, he was the prime mover in the establishment of the BEI Danbury branch on the Western Connecticut State College campus.

Named Engineering Fellow at BEI

Along with his BEI post, Ziegler serves as director of manufacturing for Cognitronics Corporation in Stamford. He is vice president of Stamford's Long Ridge Volunteer Fire Company and city representative to the Area 9 Cable Council, whose operations committee he chairs.

Actively involved with educational and community activities, as well as with his professional engineering duties, Geza Ziegler represents what is good about America. Thus it's no mere coincidence that he does voluntary free-lance broadcasting for Radio Free Europe extolling the American way of life.

Arthur Rudman is a special representative for Franklin Life Insurance Co. He is located in North Anson, ME.

1957

Crosby Adams, still a project director for Wilbur Smith & Assoc., Columbia, SC, has recently been involved with company projects in Hong Kong, Norfolk, VA, and Lansing, MI.

Since 1959, **Edwin Ahlstrom** has served as a research physical scientist at the U.S. Army Electronics Technology and Devices Laboratory at Fort Monmouth, NJ. With the U.S. Army Reserves for 22 years, he retired as a division inspector general.

Saltwater fishing and cross-country skiing are two activities enjoyed by **Arthur Anderson,** who is chief of test engineering at Hamilton Standard in Windsor Locks, CT. Active in his church, he has been Sunday School superintendent, trustee and a deacon.

Joseph Arcari, Ltc., U.S. Army, Ret., is currently a general engineer and program manager for military construction for the U.S. Army in Europe. He likes to fix old cars.

Raymond Archambault is concerned with product operations management at Digital Equipment Corp., Merrimack, NH. Running and amateur theatricals are outside interests.

"Have always been involved in all aspects of military satellite communications," says **John Atchison, Jr.,** a group leader at Mitre, Bedford, MA. He belongs to the IEE, ARRL and the Masons.

Adrian Atkins, a registered civil engineer in Connecticut, holds the post of manager of the Civil Engineering Division at Aetna Life and Casualty, Hartford, CT. He also conducts his own construction/demolition business and is actively engaged in the design and selling of Ward Log Homes.

After spending 23 years with FMC Corp., **Philip Backlund** joined Rockwell International in Troy, MI, in 1980. As manager of energy and environmental management, he is responsible for environmental control and energy conservation for approximately 40 plants within automotive operations.

John Bandarra, Jr., is plant manager for Tampax, Inc., in Clarement, NH. He is active in Rotary and the K of C and previously served on the board of directors of the YMCA and the Chamber of Commerce.

Currently, **Dick Barlow** holds the position of president at Bentley Harris, a subsidiary of Raychem, in Lionville, PA. Earlier he had been with the Signal Corps and GE. He attended Harvard Business School.

Fred Barry, president of Valve Components, Inc., Worcester, has three sons who work in family businesses and are "trying to push Dad into early retirement." (They are **Wayne, '81, Al, '77,** and Frederick, who graduated from Worcester State in 1977.) Fred is also president of New England Specialty Nut Co., Inc. and Largo Corporation.

1958

Robert Bernard is president of Canaan Computer Corporation in Westport, CT.

Lionel Irvine serves as associate transportation engineer for the California State Department of Transportation with headquarters in Los Angeles.

Continuing with GenRad, Inc., **Howard Painter, Jr.,** is now vice president and general manager of the firm in Phoenix.

Stewart Staples was slated to be chairman of the Ladies Professional Golf Association event held in Tucson last summer. Earlier he was named tournament chairman of the $300,000 Joe Garagiola Tucson Open. He is owner of Staples Building and Development Co., Inc.

Currently, **Andrew Szypula** serves as assistant chief engineer for Bethlehem Steel Corp. in Baltimore.

Robert Weinberg continues as president of Economy Electric Supply, Inc, the business he took over from his father 16 years ago. The company, located in Manchester, CT, is one of the country's largest single-distribution centers.

1959

Robert Basil has been appointed marketing manager of new products for Waring Products Division in New Hartford, CT. He is responsible for the division's marketing efforts in the development of new products. Prior to joining Waring, Basil was founder and president of his own consulting firm which specialized in market development and investment activities for clients within the consumer products and chemical industries.

Richard Bourne is general supervisor at Kodak Apparatus Division, Rochester, NY.

Normand Depratti holds the position of R&D manager of electronics for American Optical Corp. He is headquartered in Keene, NH.

John Gale is a senior program manager for AVCO Systems Division, Wilmington, MA. He lives in Sudbury.

Dr. **Frederick Lutze, Jr.,** is a professor in the department of aerospace and ocean engineering at Virginia Polytechnic Institute, Blacksburg, VA.

Alexander Swetz, Jr., works as a division substation engineer for Public Service Electric & Gas in Clifton, NJ.

Winthrop Wassenar, assistant director of the physical plant at Williams College since 1964, will become director in December. A registered professional engineer, he is also a member of the American Arbitration Association, called upon to arbitrate disputes that arise during construction projects. While at Williams, he has supervised many major construction projects.

John Wolfe continues with EG & G Sealol, North American Operations, Warwick, RI.

1960

George Beebe is a staff engineer for MIT Lincoln Lab., Lexington, MA. He writes: "Will return from Kwajalein to Massachusetts in June."

Donaldson Dow serves as a senior analytical engineer at Perry Oceanographics, Inc., Riviera Beach, FL.

Russell Fransen is a consulting engineer and land surveyor for Fransen Consultants, Norwich, CT.

William Kerr serves as a project manager at Pratt & Whitney Aircraft in East Hartford, CT.

Donald MacMillan is a technical manager at GCA Corporation, Burlington Division, Bedford, MA.

Lt. Col. **Robert Mulholland, Jr.,** writes that he is director of procurement for R&D for the U.S. Army at Ft. Monmouth, NJ.

Dr. **Charles Stevens** was recently appointed dean of the School of Engineering Management and Technology at Purdue University (Calumet) in Indiana. Previously, he was acting dean of the Southern Technical Institute, the engineering technology division of Georgia Institute of Technology, and before that he had served on the faculty and administrative staff of Southern Tech in Marietta, GA. A registered professional engineer, he has conducted consulting assignments for such industries as the Bendix Corporation, Caterpillar Tractor Co. and Hallmark Cards.

Jon Thorson is an advisory engineer for IBM in Kingston, NY.

1961

Roger Faulk has been appointed assistant director in the casualty-property commercial lines department at the Travelers Insurance Companies in Hartford, CT. He joined the companies in 1971 as an underwriter.

William Holmes holds the post of manager of product marketing at Wyman-Gordon Co., Grafton, MA.

Thomas Maloney, Jr., a vice president of E.F. Hutton and manager of the firm's Burlington (MA) office, has been named to Hutton's 1982 President's Club. Appointment to the group, based on individual leadership performance, is awarded to only 25 managers from the total of 320 in Hutton's branch office system. Maloney joined Hutton in 1975.

Paul McCarthy holds the position of district manager at New England Telephone in Framingham, MA.

Yesugey Oktay has been promoted to division head of mechanical and structural engineering at Boston Edison Company.

Alan Roseen serves as a senior engineer at GE in Utica, NY. He resides in Frankfort.

Edward Sundburg was recently named as a worldwide business manager at Norton Industrial Ceramics Division, Worcester. Previously business manager of advanced ceramics, he will now be responsible for business operations of Crystar(R) recrystallized silicon carbide electronic components throughout the world.

1962

William Brutsch was recently appointed director and chief engineer of the Metropolitan District Commission Water Division in Boston. He supervises the division's $11 million budget, its $100 million capital program and 400 employees. A major in the U.S.A.F. Reserve, he also belongs to the National and the Massachusetts Society of Professional Engineers.

Robert Chapin has been with the New York State Dept. of Transportation for 20 years.

Formerly with GTE Sylvania, **David France** is now technical director for UNNEX, Salem, NH. He resides in Hillsboro.

Lewis Huntoon has been promoted to manager of purchasing and production services at Hitox Corporation of America and Nova Oil Field Chemicals, a division of Hitox.

Dr. **John Lukens** serves as vice president of Geodata Systems International in Nairobi, Kenya. He received his PhD from Cornell.

Bernard Meister has been advanced to associate scientist at the Dow Chemical Co., Midland, MI.

Philip Pilibosian is general manager at Pacific Telephone in Los Angeles.

Eugene Rheault is now a principal engineer at International Laser Systems, Orlando, FL.

Dr. **John Tien,** professor of metallurgy and director of the Center for Strategic Materials, Henry Krumb School of Mines, Columbia University, was coauthor of "Metallurgy in China Today and the First U.S.A.-China Bilateral Metallurgical Conference," which appeared in the March issue of the *Journal of Metals.*

1963

Earl Fratus serves as project manager at Sheldon L. Pollack Corp. He is located in Houston.

Dennis Heath is supervisor of production engineering for GE in Plainville, CT.

Dr. **Richard Kashnow** continues with GE in Cleveland, OH. He is now product general manager.

Robert Jamaitis has been appointed vice president of manufacturing at United Technologies' Norden Systems. He joined Norden in 1963 and most recently served as operations manager. He holds an MBA from the University of Bridgeport.

Steve Mozden has been appointed to the town appropriations committee in East Longmeadow, MA. He is a senior engineer in preliminary design at Hamilton Standard and recently received his MBA from Western New England College.

1964

John Arserio, Jr., serves as New England area sales manager at Hewlett-Packard Co., Lexington, MA. He resides in Andover.

Frederick Borgeson holds the position of director of engineering at Aydin Microwave, San Diego.

Walter Gonla serves as marketing manager for industrial products at Johnson, a division of UOP, Inc., St. Paul, MN.

Philip Johnson works for Electro Mechanics, a subsidiary of Combustion Engineering in New Britain, CT.

Charles Lombardo is president of Petro-Art Ltd., Inc., Trenton, NJ.

Bruce Ochieano serves as director and assistant treasurer at Advanced Micro Devices, Inc., Sunnyvale, CA.

Richard Parzuchowski holds the position of vice president at Chromalloy R&T, Orangeburg, NY.

David Stone is manager of engineering for the Power Breaker Division of Siemens-Allis, Inc., Jackson, MS

Pete Tancredi holds the position of vice president at Camp Dresser & McKee, Walnut Creek, CA.

John Wetherell is engineering and operations manager for the Federal Reserve Bank of Boston.

1965

Marvin Berger has formed Adelphi Management Services, a consulting firm in Bedford, NH. The firm aids small and medium-sized companies in solving operational problems. Previously, Berger was vice president and general manager of the Chancellor Equipment Co., and served in sales, marketing and management posts at IBM.

Continuing with BF Goodrich Company, Akron, OH, **Francis Cantello** is currently a technical manager for the firm in Aukland, New Zealand.

David Clayton is the senior vice president of finance at Trans Ocean Leasing Corp. in San Bruno, CA.

Jim Fee has joined Contrex, Inc., Burlington, MA, a newly formed company that develops products which will apply artificial intelligence and machine vision to the inspection process in manufacturing operations. He is sales and marketing manager.

Nicholas Gallinaro was coauthor of "Fabricated Valves Work for Sasol II," which was published in the April issue of *Welding Design & Fabrication.*

David Geiger serves as manufacturing manager at The Torrington Co., Torrington, CT. He has an MS in management from RPI.

Donald Gregoire works as an electromagnetic systems engineer for IBM in Owego, NY.

Charles Hunnicutt serves as a department head for Bell Telephone Labs. in Naperville, IL.

Robert Klauber is now with Volt Technical Services, New York City. In March he received his PhD from Virginia Polytechnic Institute & State University.

Philip Nims is chief of product development at Leesona in Warwick, RI.

Richard Seaver holds the post of project manager for Building Automation Systems, Farmington, CT.

1966

Dr. **Andrew Fish, Jr.,** assistant professor of electrical engineering at the University of Hartford, co-chaired the nonlinear group at the 1982 American Control Conference in June in Arlington, VA. He presented a paper at that conference, as well as other papers at recent similar conferences in Raleigh, NC, and New York.

Dr. **John Lauterhach** is an analytical research division head for Brown & Williamson Tobacco, Louisville, KY.

John Morawski, still with Niagara Mohawk Power, is now associate senior project control engineer for the company in Syracuse, NY.

George Ordway is president of C. G. Bostwick Co. and of Bostco Industries, Hartford, CT.

Donald Petersen, Jr., is working in the display products area for IBM in Kingston, NY. He recently moved to Woodstock, NY, from Miami.

Robert Plum is the principal engineer at Converse Consultants, Seattle, WA.

Anthony Sacovitch serves as chief engineer at Wright Machine Corp., Worcester.

Tod Wicker continues as manager of financial projects for the Public Service Co. of New Hampshire in Manchester. He holds an MBA from Northeastern, is married and the father of two sons, Eric and Tom.

1967

Charles Bergeron continues as supervisor of nuclear safety at Stone & Webster, Boston.

Charles Case holds the post of department manager at Raytheon in Sudbury, MA.

Roger Daugherty has been named vice president of corporate development for SelectTV, Marina Del Rey, CA. Formerly he was vice president of management systems. In his new post, he will be in charge of technology planning and development in the area of home communications and entertainment.

Roy Fedotoff is employed as a supervising engineer at Brown and Caldwell, Consulting Engineers, in Walnut Creek, CA.

1968

Paul Arruda is an area technical superintendent for Du Pont in Beaumont, TX.

William Belisle is still training manager at Airesearch Mfg. Co. in Torrance, CA. In March he received a certificate in personnel management from UCLA.

Joseph Borbone is a project engineer for Warner & Swasey Co., Grinding Wheel Division, in Worcester.

John Cyranski is now an assistant professor in the department of physics at Hobart and William Smith Colleges, Geneva, NY.

John Elphinstone is manager of cost accounting at L'eggs Products, Inc., in Winston-Salem, NC.

After eight years with the Connecticut Department of Public Utility Control Authority, last November **Roh Gallo** joined American Water Works Service Co., Haddon Heights, NJ, where he is director of rates and revenue.

Mark Huhelhank holds the post of vice president of Cardio Data Corp., Marlboro, MA.

Paul Larini has been named an associate of the Society of Actuaries. He is the manager of individual reinsurance services at State Mutual in Worcester and has an MS degree in actuarial science from Northeastern.

Israel Mac wrote "Atlanta and Transportation: Entering the New Decade" for the April issue of *ITE Journal.*

William O'Neil now works in project control for Union Carbide in Oak Ridge, TN.

Raymond Racine has been named assistant manager of the Cool Water Coal Gasification Program in Texaco's Alternate Energy Department. With headquarters in Harrison, NY, Racine is responsible for coordinating Texaco's engineering, construction and operations activities in the $300-million program.

Robert Woog is district data systems manager for AT&T Long Lines, Morristown, NJ.

1969

James Atkinson is now engaged in the practice of law at 50 Milk St., Boston, and in South Harwich, MA.

John Connell, Jr., has been appointed assistant director, strategic planning, automation, in the data processing and management services department of Aetna Insurance Company.

J. B. Flynn received his MBA from the University of Lausanne in Switzerland last year. He is national sales manager of Commercial Financial Service, General Electric Credit Corporation, Stamford, CT.

James Haury serves as a director of manufacturing at Farrel Company, Ansonia, CT.

Larry Katzman, president of Thermal Data Corporation of Newtonville, MA, was a seminar discussion leader and workshop director at the NEFI Sales Direction Seminars held in Waltham, MA, and Concord, NH, in January. He spoke on "Effectively Opposing Natural Gas (and Electric Heat) Competition."

Richard Palm continues with Digital Equipment Corp. He is now the professional software service business manager for the company in Waltham, MA.

Raymond Stanley serves as engineering supervisor at General Dynamics-Electric Boat in Groton, CT.

1970

MARRIED: Lillian M. Peplau and **Craig D. Olmsted** in Lexington, MA, on June 12, 1982. The bride, a free-lance graphic artist, graduated from UConn. Olmsted holds master's degrees in engineering and management and is employed at Chas. T. Main, Inc., Boston.

John Boyd works as a technical marketing supervisor at Hewlett-Packard, Waltham, MA.

Lawrence Cohen has rejoined Cavedon Chemical Co., Inc., Woonsocket, RI, where he is assistant to the president. He will be responsible for directing R&D activities and overseeing manufacturing and quality control. Previously, he was a research chemist at Union Carbide and Kendall Company.

John Ducimo serves as manager of reclaim systems for Nelmor Co., Inc., North Uxbridge, MA.

Dom Forcella is one of two Yale graduate students who have been studying possible uses of some town-owned property in Waterford, CT. The town study is a requirement for his master's degree in environmental studies.

Robert Grillo has been hired as an assistant engineer by the City of Willimantic, CT. For the past five years he has served as senior transportation planner for the Nashua, NH, Regional Planning Commission.

Robert Kenney has joined Vermont Yankee Nuclear Power Corp. He resides in Keene, NH.

Raymond Pajer serves as a senior research engineer at Smith-Corona in the R&D lab. in Newtown, CT.

Randolph Sablich currently is director of subcontracts business operations at Grumman Aerospace, Bethpage, NY.

Anthony Toscano is now a senior project manager for GE's Environmental Services, Inc., Lebanon, PA.

Frank Zone, Jr., is a staff engineer for Riley Stoker in Worcester.

1971

Richard Arena serves as regional sales manager for Weber Metals, Farmington Hills, MI.

Paul Ash, director of professional personnel and staff development in Wellesley, Mass. schools, recently received his PhD in educational administration and supervision from Boston State College. He has his master's degree in teaching from the University of Massachusetts in Amherst and a certificate of advanced study from the Harvard University Graduate School of Education.

John Giordano has been promoted to assistant vice president in the management science section of the corporate finance group at Rhode Island Hospital Trust National Bank, West Warwick, RI. Before joining the firm in 1970, he was with Old Stone Bank. Last year he served as treasurer of the New England Economic Project.

Mathew Gluckson holds the post of vice president at Sunrise Knitwear Co., Inc., New York City. He and his wife, Judy, have two children and reside in White Plains, NY.

Michael Hitchko is with Chas. T. Main, Inc., Boston.

Chris Johnson has been named chief of the radioisotope group at Letterman Army Institute of Research, San Francisco. His wife, Karen, is working in microbiology at Letterman Army Medical Center.

Emile Levasseur holds the position of process engineering manager at King-Seeley Thermos Co., Norwich, CT.

Dr. **Richard Lindsay** was co-editor of a book entitled *Grinding Technology and Troubleshooting* published by the Society of Manufacturing Engineers, Dearborn, MI, in January.

Currently, **Joseph Najemy** serves as president of Solar Marketing Associates, Inc., Worcester.

Kevin O'Connell works as a staff engineer at Arkwright-Boston Insurance, a division of Factory Mutual, in Greenwich, CT.

Francis Scricco has been appointed general manager of the GE Room Air Conditioner Department, Louisville, KY. After six years as a management consultant with the Boston Consulting Group, he joined GE in 1979 as manager of strategy development for consumer products at corporate headquarters in Fairfield, CT.

Norman Sousa, Jr., serves as vice president of Sousa Corp., West Hartford, CT.

Thornton Waite is a project engineer at EG&G, Inc., Idaho Falls, ID.

Dana Worthley is an associate engineer at Fram Corporation. He is located in East Providence, RI.

Michael Zarrilli holds the position of vice president at Manufacturers Hanover Trust Co., New York City.

1972

Jared Bruckner is chairman of the mathematics and applied science department at Atlantic Union College, South Lancaster, MA.

Samuel Cuscovitch has been appointed assistant director of telecommunications services, information services, in the resources and services division of Connecticut General Life Insurance Company. He joined information services in 1976 as senior data communications analyst and was named senior technical consultant in 1980. In 1974 he received his master's in information sciences from the Hartford Graduate Center.

John Ferraro has been promoted to supervisor of generation electrical engineering at Northeast Utilities, Hartford, CT. He began as an assistant engineer in the protective relaying department at the company's Berlin general offices in 1972. A member of IEEE, he is also a registered professional engineer in Connecticut.

Joseph Gotta was recently promoted to eastern regional sales manager for Galileo Electro-Optics Corp. He will be responsible for all sales activity within the eastern part of the U.S. and Canada.

David Horrocks serves as facilities engineering manager at The Foxboro (MA) Company.

Currently, **Stephen Joseph** holds the post of manager of New England Telephone, Boston.

Vahe Krikorian is manager of manufacturing quality assurance at Digital, Marlboro, MA.

Thomas Murphy is regional sales manager for Filterite, a subsidiary of Brunswick Corporation located in Timonium, MD.

Gary Rand currently works as a project engineer for Xylogics, Inc., Burlington, MA.

Thomas Reynolds is supervisor of the Corporate Internal Audit Department at Occidental Petroleum Corp., Houston, TX.

Dr. **Kenneth Wadland** continues with Wadland Software Consulting, Fitchburg, MA.

1973

MARRIED: Bruce J. Foster to Melissa S. Kirchner in Dalton, MA, on May 22, 1982. She graduated from Bryant College, Smithfield, RI, and is a computer graphics secretary for GE in Pittsfield, MA. Foster is a microprocessor design engineer at GE.... **Michael L. Hetzel** and Kathleen E. Williamson in Cape Elizabeth, ME, on May 1, 1982. She graduated from SUNY at Oswego, did graduate work at Cornell University, and now manages a gift store. The bridegroom is a reliability engineering specialist for Data General Corp., Westbrook, ME.

David Bedard holds the post of B Company Commander for the U.S. Army. He resides in Edgewood, MD.

Dennis Beliveau is employed as manager of product control for rotating parts at GE's Gas Turbine Division in Schenectady, NY.

James Davis manages technical services for the coal products group at Wen-Don Corp., Roanoke, VA.

Ralph Desmond is starting the second year with his own computer-education firm, Desmond & Associates, Boston, MA. He also teaches at UMass in Boston. Last December he spoke on entry-level DP training at a national conference: Data Training, '81.

George Harris is employed as a senior hardware engineer at Gould Inc.-Modicon Division in Andover, MA.

Herbert Hedberg serves as vice president of

operations at Autochrom, Inc., Milford, MA.

Steven Jaffe is employed as a senior field representative at Hamilton Standard in Holland.

Stephen Kaminski works as an assistant engineer for New Hampshire Electric Cooperative, Inc., in Plymouth.

Basil Karanikos is employed as a senior electrical engineer at Sweetheart Plastics, Inc., Wilmington, MA.

Robert Kibler, still with Rodney Hunt Co., Orange, MA, is currently quality assurance manager for the firm.

Donald Kray serves as a development administrator at Aetna Life & Casualty, Hartford.

Continuing with Raytheon Service Co., **John Manzo** serves as general manager of the company's Mid-Atlantic systems facility in Mount Laurel, NJ.

William Nutter is now data processing system (DPS) STS–3 flow lead engineer at Rockwell International, Kennedy Space Center in Florida. Besides being responsible for DPS planning and scheduling, he is single-point contact for all DPS activities.

Thomas Savage works as a market development specialist at GE Plastics in Louisville, KY. The Savages have three children.

Thomas Szatkowski is an attorney with Cravath, Swaine & Moore in New York City.

Now with Fenn Manufacturing, **John Taylor** holds the post of project engineer in Newington, CT.

A. Richard Urjil, Jr., formerly with the Borg Warner-Morse Chain Division, is now a sales manager for Lamont & Getrag Gear Co.

James Viveiros works as a product marketing engineer in the Colorado Springs Division of Hewlett-Packard in Colorado.

Currently, **Mary Zoeller** is employed as a product manager at Hewlett-Packard Company, San Diego, CA.

1974

BORN: to Judy and **James W. Bowen** a daughter, Margaret Ann, on April 16, 1982. Margaret has a sister, Andrea, 4, and a brother, Christian, 2. Jim is with Pratt & Whitney Aircraft, Government Products Division, West Palm Beach, FL. . . . to Mr. and Mrs. **Lee D. Turner** a daughter, Kathleen Elizabeth, on March 21, 1982.

Roger Broeker, Jr., serves as a senior instrument design engineer for Crawford & Russell, Inc. He is located in Houston.

Wayne Bryant is now manager of Host Computer group at Teradyne, Boston.

Recently **Steve Dacri** performed at the Magic Castle in Hollywood, with Barbara Mandrell (also in Hollywood), on the "Good Day" TV show in Boston and with Robert Klein in Acapulco, Mexico.

Stephen Engel works as a project engineer at Grumman Aerospace Corp., Bethpage, NY.

David Gerth is involved with financial planning at Computervision Corporation in Bedford, MA.

Formerly with California Pacific Utilities, **David Gracie** is currently employed as a project manager for Levi Strauss & Co., San Francisco.

Michael Hartnett has been named director of research of The Torrington Co., where he will be responsible for development of new products and materials, as well as manufacturing processes. With a PhD from the University of Connecticut, he joined Torrington in 1972 as a project engineer. Since 1980 he has been assistant director of research. The author of several scientific papers, Hartnett has introduced state of the art, computer based techniques for advancing the design and application of rolling element bearings.

Lawrence Hunter holds the post of senior engineer at Westinghouse Electric, Baltimore. He resides in Glen Burnie.

James Kennedy is a hurricane planner with Civil Defense in Hawaii.

Jim Kudzal has received his master of engineering administration degree from The George Washington University. Jim, who also holds an MS in physics, is employed as a technical manager by the U.S. Navy in Washington, DC. He recently won a trophy for outstanding performance in karate.

Fr. **Victor Melehoy** (formerly Melechow) is now a priest at the Holy Resurrection Russian Orthodox Church in Worcester.

Robert Praino, Jr., who resides in Westwood, MA, works in R&D and film manufacturing development at Polaroid, where he is a senior engineer.

S. Scott Rine serves as a deputy equal opportunity training officer for the Navy, Department of Defense, Boston.

Joe Strempek continues as a field service engineer for Babcock & Wilcox. He just completed the start-up of a 450-megawatt lignite-fired utility power plant where he was lead engineer for a $200-million contract which included the boiler electrostatic precipitator and wet-limestone scrubber systems.

Richard Takanen holds the position of manager of shop operations at GE in Cincinnati, OH.

Jay Thayer has been elected president of the Jaycees in Westboro, MA. He is an assistant project manager for the Yankee Atomic Electric Co. in Rowe.

Craig Tyler was recently named a military sales engineer for R.F. Cable Products Division of Times Fiber Communications, Inc. Formerly he was with Tuttle & Bailey Co., a manufacturer of products for the energy industry. Currently, Tyler is completing his MBA at the Hartford Graduate Center.

Peter Walworth is manager of facility planning and engineering at Applicon in Burlington, MA.

1975

MARRIED: Charlene M. Hodgkins to Roy K. Rigie on April 4, 1982 in Sutton, MA. The bride is with Cyro Industries in Stamford, CT. Her husband, a chemical engineering graduate of the University of Connecticut, works for American Cyanamid, also in Stamford. . . . **Edward T. Griffin** and Leong Foong Har in San Diego, CA on May 8, 1982. Griffin, still employed at Dymac Division, is also studying for his MBA at the University of San Diego.

BORN: to Julie and **Dick Perreault** a daughter, Maressa Anne, on May 13, 1981. Dick is a field engineer for the circuit test systems group at Hewlett-Packard, Lexington, MA.

Jon Anderson now works for the Vermont Department of Public Service representing the public in rate cases before the Public Service Board.

Continuing with the Linde Division of Union Carbide, **John Batt** currently serves as marketing product specialist in Somerset, NJ.

Karenann Brozowski is a senior process engineer at Corning Medical & Scientific, a division of Corning Glass Works in East Walpole, MA.

Mark Chevrier is employed as a project engineer at Lego Systems, Inc. He is located in Enfield, CT.

Tee for Two— And, Maybe, Five!

His oldest son, Joey, 5, can already hit a golf ball 50 yards, Jack Gale, '70, reports with parental pride. His twin sons, Michael and Daniel, 3, cannot match their big brother's swing, but it's a safe bet that they will take a liking to the little white ball. If golf genes can be inherited, surely the sons of Jack and Mary Carr Gale have them in generous supply.

Take Jack, for instance. Golf has been his life. A member of the Professional Golfers' Association, he's served as a pro at Worcester's Green Hill Country Club, Holden Hills and the Rochester (NH) Country Club. This year he became pro at Tatnuck Country Club, introducing the club to its first pro-member tournament.

Take Mary. She's won the New Hampshire women's championship twice. This summer she was champion of the Worcester County Women's Golf Association. Her brother is Joe Carr, the current New England PGA champion.

When Jack invited Mary to join him for the Pro-Lady Championship in 1978 and 1980, they won both times. In 1973 he led his team to victory in a pro-member club tournament in Melbourne, FL. Since that time, he has often played the winter golf circuit in Florida.

Jack, the son of Joe Gale, ME laboratory technician at WPI, caught the golf bug late. "But once I started playing in my mid-teens, I was hooked." At WPI he captained the golf team. "When I graduated, there weren't many jobs for mechanical engineers. I loved golf. I decided to turn pro."

Teenage boys often dream about becoming professional athletes. Jack Gale dreamed, too. The difference is, he made his dreams come true.

Still in Houston, **James Costello** is now a senior construction engineer at Transcontinental Gas Pipeline Co.

William Cunningham is with Chas. T. Main, Inc., Boston. Besides his MS from WPI, he holds degrees from Worcester Junior College, Northeastern and Western New England College.

Bill Faltas, senior actuarial assistant with Aetna Life & Casualty of Hartford, received his associateship designation in the Casualty Actuarial Society at the Society's spring meeting. The designation can be achieved only through successful completion of seven comprehensive insurance examinations.

Stephen Fitzhugh has been appointed sales representative in the Northeastern District for GE's Wire and Cable Department, which manufactures a complete line of insulated electric wires and cables.

Eric Isbister holds the position of chief nuclear test engineer at Electric Boat Division of General Dynamics, Groton, CT.

Nicholas Kyriakos continues as a construction resident engineer for Texasgulf, Inc., Aurora, NC.

Ronnie Materniak recently returned to Wilmington, DE, as a specialist engineer in the design division, following two years with Du Pont's Construction Division in Richmond, VA. This spring he completed his MBA at the University of Richmond.

Paul O'Brien is a seminarian at Pope John XXIII National Seminary, Weston, MA.

Barrett Pett is a general manager at Tally's Inc., Gloucester, MA.

Francis Schlegel, Jr., serves as production area foreman at UniRoyal Chemical Division in Geismar, LA.

Wayne Stratton is an electronics technician at Microlog Corp., Gaithersburg, MD.

Stephen Zambarano, who is with the Systems Laboratory Branch of the Naval Underwater Systems Center in Rhode Island, has been selected by NUSC to participate in its long-term graduate level training program. An electronic engineer, he will attend the University of Rhode Island.

1976

MARRIED: Greg W. Dubin and Linda A. Morrissey in West Hartford, CT, on June 12, 1982. The bride graduated from Hartford College for Women, the University of Hartford. Dubin serves as a research engineer at Combustion Engineering in Windsor. . . . **James R. Hall** and Laurie J. Dempsey in Dedham, MA May 1, 1982. She graduated from Smith College. Hall is a consultant at Arthur Andersen & Co., Boston. . . . **Stuart B. Siegel** and Debra L. Swartz on January 24, 1982 in Malden, MA. The bride, who is employed by the Boston Eye Clinic, has a BA from UMass. Siegel is a chemical engineer at Hewlett-Packard in Waltham.

Joseph Adams is a project engineer at D'Appolonia in Milwaukee.

Richard Allen owns Richard K. Allen, P.E., Meriden, NH.

Daniel Brock is a captain in the Southborough (MA) Fire Dept.

Ray Calabro serves as a pipe engineering supervisor for Daniel Construction at the Wolf Creek Project in Kansas.

Mike Dabkowski works as a research engineer at Mobil Research & Development Corp., Paulsboro, NJ.

Andra Eslami Finkel has received her JD degree from Whittier College in California and was slated to sit for the July California bar exam. She is now with Blakely, Sokoloff (**Stanley Sokoloff, '59**), Taylor & Zafman in Beverly Hills, specializing in patent, trademark and copyright law. She and her husband, Charles, have one son.

Sidney Formal is with the U.S. Army Corps of Engineers at the Water Resources Support Center in Ft. Belvoir, VA.

Richard Hansen serves as president of Air Stations, Inc., Boston, MA. Last year he received his MBA from Boston University.

Sterling "Buzz" Hassler has been promoted to divisional vice president and general manager for the U.S. Diamond Products Division of Norton Co. Previously, he had been director of marketing planning in the abrasives marketing group.

John Heid holds the post of manager of distribution operations at Max Factor & Co., Oxford, NC.

Paul Jacques, still with Kodak, is now a senior coordinating engineer for the firm in Rochester, NY.

Greg Kedderis has received his PhD in biochemistry from Northwestern University Medical School in Chicago. He is a postdoctoral fellow at the Chemical Industry Institute of Toxicology in Raleigh, NC.

Peter Krupinsky is a public defender in Los Angeles County, Los Angeles, CA.

Paul Lessard holds the post of chief of the department of engineering for the 102nd Air National Guard. He resides in North Truro, MA, with his wife, Noreen, and two children.

Jay Manning works for Megatest in Wakefield, MA.

Penny McLean is currently a senior engineer in the Tech Photo Division of Polaroid providing manufacturing technical support to the 4x5/Roll Film Manufacturing Group. She is headquartered in Waltham, MA.

John Moroney, Jr., is employed as operations manager at Microwave Associates, Burlington, MA. He lives in Boston.

Still with Riley Stoker, Worcester, **John Scott** serves the company as a proposal engineer.

Michael Whelan works as a clinical engineer at the University of Massachusetts Medical Center, Worcester.

1977

MARRIED: Gordon Walton, III, and Rhonda K. Carlson in Houston, TX, on May 29, 1982. The bride graduated from the University of Houston and is a software design engineer for Texas Instruments, Houston, where her husband is an electronic design engineer. Walton holds a master's degree from Northwestern University, Evanston, IL.

E. J. Betti serves as a stress analyst for Bechtel (subcontractor) in Ann Arbor, MI.

Robert Cataldo is a programmer-analyst for the Hartford Insurance Group of ITT in Hartford, CT.

Bill Cunningham is now in marketing in the commercial division of Meditech in Cambridge, MA. This spring he not only graduated with his MBA from Tuck School, Dartmouth, he was selected by the members of his class to be guest speaker at the graduates' investiture service.

Gary Davis works as a systems analyst for Dialcom, Inc., of Silver Spring, MD. He also is a student in motion-picture production at the University of Southern California.

Elizabeth Ernst continues with the department of engineering at Inco Electro Energy, Madison, WI.

Kenneth Fox is a senior account associate at the Foxboro Co., West Hartford, CT.

Eric Hertz is employed as a staff supervisor at AT&T Long Lines in Bedminster, NJ.

Robert Hyland is a research associate at Hahnemann Medical College and Hospital in Philadelphia.

Todd Leen continues as a graduate student in the department of physics at the University of Wisconsin in Milwaukee.

Jim Leighton, formerly with Raytheon, Reading, MA, has taken a new post in navigation systems analysis at Analytic Sciences Corporation. The Leightons have purchased a condominium and still enjoy sailing their 25-ft. sailboat.

Stuart Merrell is a design and estimating engineer at Reisner Metals, Southgate, CA.

Bruce Minsky has received his MD degree from the University of Massachusetts, Worcester. For his residency, he is specializing in radiation oncology at New England Deaconess Hospital, Boston.

Daniel Rodrigues serves as a software design engineer at Simplex Time Recorder Co., Gardner, MA. He and Maryann have two children and reside in Lunenburg.

Continuing with GTE Sylvania, **Amy Schneider** is currently a senior programmer for the company in Danvers, MA.

J. Gilbert Wilson, III, holds the position of manager of sales engineering at Varco Pruden Buildings in St. Joseph, MO.

1978

MARRIED: Thomas Monroe and Denise Fournier in Mansfield, RI, on April 17, 1982. The bride graduated from Westfield (MA) State College and is a special-needs teacher in Foxboro. Monroe serves as a senior project engineer for Johnson Controls at the Seabrook nuclear power plant in New Hampshire. . . . **Carla L. Smith** and David Gamari on May 1, 1982 in New Castle, NH. Mrs. Gamari graduated from UNH and received her master's degree from WPI. She is with Digital Equipment Corp. of Bedford. He is a graduate of Hobart College and works for Hybrid Components, Inc., Beverly, MA.

Gerald Baird, Jr., is a captain in the Ordnance Corps for the U.S. Army.

Donald Clemmey has been promoted to actuarial assistant at State Mutual Life Assurance Co. of America in Worcester. He joined the firm as actuarial associate in 1979. This year he earned his associate designation in the Society of Actuaries.

Jeffrey Firestone holds the post of level II designer for ground support equipment and electrical systems at Rocketdyne, Canoga Park, CA.

Don Fontaine works as a sales engineer at

Electro-Craft in Hopkins, MN.

Bryce Granger is a project engineer at McNeil Akron, Inc., Akron, OH.

Ruth Heselbarth serves as a senior accountant (CPA) at Peat, Marwick, Mitchell & Co., Boston.

Osamu Kimura holds the post of utility construction management specialist for the New York State Public Service Commission.

Carl Klein graduated from Harvard Business School in June. This fall he starts work as an associate in Fleet Venture Resources, Providence, RI.

Terry Landers, a data base manager at the New England Telephone Co., spoke at Dedham (MA) High School in March on "Careers in Engineering."

Laura Mattick, still with Procter & Gamble, was recently promoted to mechanical department manager at the St. Bernard soap and detergent plant. She has responsibility for 15 craftsmen, nine production lines and a $1.8-million productivity improvement project.

Alok Misra writes that he is the sole proprietor (computer consultant) for ACM Software, Burlington, MA. He is also a graduate student at MIT.

Anthony Raymond is a senior engineer in storage systems at Digital Equipment Corp., Maynard, MA.

Robert Sherburne continues as a graduate student at the University of California, Berkeley.

Ken Swenson works for General Ionex in Newburyport, MA.

Karlis Viceps is an environmental engineer at Energyscapes, Taos, NM.

John Wallace is on the technical staff at Bell Labs, Naperville, IL.

Randall Wyatt is a project engineer at GE in Collingdale, PA.

1979

MARRIED: Roland Brooks and Cornelia Moore recently. The bride, a secretary, graduated from the State University of New York at Delhi. Brooks is now a teaching assistant in the CAB Labs at WPI. . . . **Garrett A. Chace** and Dianne M. Parker in Tiverton, RI, on June 12, 1982. Mrs. Chace graduated from Quinsigamond Community College, Worcester. Her husband is with Killingly Building Products, Dayville, CT. . . . **Mark J. Groves** to Barbara G. Sweeney on May 8, 1982 in Cumberland, RI. Mrs. Groves graduated from Becker. The bridegroom has an MSEE from Syracuse University and is a system engineer at Simmonds Precision in Vergennes, VT. . . . **Carolyn Jones** and 1st Lt. John Kikuchi, an electrical engineering graduate from the University of California at Berkeley, on October 24, 1981. The bride is still stationed at Brooks AFB, where she is an AF acoustics consultant.

Dean Bogues is a sales representative for Hewlett-Packard in Lexington, MA.

Scott Booth works as an assistant project engineer for Turner Construction Co. and lives in Burnt Hills, NY.

Stephen Caputo holds the post of district sales manager at GE in Milwaukee.

Robert DeMarco is now a diagnostic imaging sales representative in GE's medical systems sales and service operation, Syracuse, NY.

In June, **Douglas DeSimone** returned from studying at the Biocenter in Basel, Switzerland. He spent the summer at the Marine Biological Laboratories in Woods Hole, MA. This fall, he is working in a PhD program in biology at Dartmouth College, Hanover, NH.

Stephen DiPietro has been awarded a master's degree in nuclear engineering at MIT. He is employed at the Bettis Atomic Energy plant in West Mifflin, PA.

Alwyn Fitzgerald plans to attend UMass, Amherst, this fall, to study full-time for his MBA degree.

Peter Greer is a pilot plant engineer for American Cyanamid in Stamford, CT.

Claire LaChance is a member of the technical staff at Mitre Corp., Bedford, MA.

Thomas Lau serves as a programmer at Subliprint Far East, Ltd., Hong Kong.

William Newhard is with Honeywell in Billerica, MA. He and his wife, Linda, live in Lincoln.

Keith Payea works as a test engineer for the John Fluke Mfg. Co., Inc., Everett, WA.

Dusan Petranovic is a lecturer at the University of Titograd in Yugoslavia.

Formerly with Procter & Gamble, **Steve Rusckowski** is now a graduate student at the Sloan School, MIT.

Carl Rutigliano holds the post of product engineer at Anderson Greenwood & Co., Houston.

Richard Schneider is employed by Texas Instruments, Attleboro, MA.

In May, **Edward Tidman, III,** received his MBA from Babson College with high distinction. He is with the commercial loan division at Mechanics Bank in Worcester and plans to attend Suffolk Law School.

Philip Turek holds the post of production planner for Parker Hannifin in Wickliffe, OH.

Paul Wrabel is a manufacturing process engineer at Babcock & Wilcox, Barberton, OH.

1980

MARRIED: William J. Keville, III, and Ann M. Lynn in Stamford, CT, on May 8, 1982. The bride graduated from Stamford High School and is employed at St. Joseph Hospital. . . . **Gary C. Sawicki** and Penny A. Pullinen on May 1, 1982 in Ludlow, VT. Mrs. Sawicki graduated from Becker and is a physical therapy assistant. Sawicki works for Texas Instruments, North Attleboro, MA. . . . **Frank P. Sloan, Jr.,** and Mary L. Pettis on May 9, 1982 in Holden, MA. Mrs. Sloan graduated from Wachusett Regional High School and is employed at American Screen Printers in Leominster. Her husband is with Norton Company, Worcester. . . . **James J. Wilbur** and **Claudia A. Huehmer** in Hudson, MA, on June 6, 1982. The bride is studying for her master's degree at WPI. Wilbur serves as a fire protection engineer for the Kemper Insurance Co.

BORN: to Eileen and **Art O'Leary** a son, Arthur James Bernard, on November 19, 1981. Art is a mechanical engineer at Artisan Industries, Inc., Waltham, MA, and Eileen works part-time at Sentry Insurance, Concord. . . . to Judy Gemma-Sjostedt and **John E. Sjostedt** their first child, Peter John, on May 24, 1982. John is still employed as a chemical engineer at Du Pont's Washington works, West Virginia plant. The baby's grandfather is **Rowland Gemma, SIM'79,** chief estimator at Morgan Construction Company, Worcester.

John Apostolou serves as a sales and development representative at Du Pont in Nashville, TN.

Keith Brown is an environmental engineer at Ecology & Environment, Inc., Woburn, MA. Formerly he was with Cullinan Engineering.

Michael Cheamitru is employed as a structural engineer at the David W. Taylor Naval Ship R&D Center, Bethesda, MD.

Duane Delfosse, an associate manufacturing engineer at IBM, lives in Mountain View, CA.

Michael Gariepy is a senior process engineer in semiconductor processing at Advanced Microdevices, Sunnyvale, CA.

David Gura serves as a senior field engineer for Schlumberger Well Services in Corpus Christi, TX.

Thomas Hogan is a hardware engineer at Prime Computer, Inc., Framingham, MA.

Rango Keshavan has a new post as an electrical engineer with the strapdown systems design group at Litton Guidance and Control, Woodland Hills, CA.

William Lee, Jr., works for Stone & Webster in Boston.

Mark Lefebvre is now a test engineer technologist at Teradyne, Inc., Boston.

Linda McInnis continues as a hardware technical writer at Computervision, Bedford, MA.

Maryellen McLaughlin is a staff engineer at HDS, Inc., Reston, VA. She is also attending Virginia Polytechnic Institute part-time, studying for her MSEE.

John Natalizia has been elected vice president of the Providence (RI) Gas Company, a wholly-owned subsidiary of Providence Energy Corporation. He joined the firm in 1975 as a statistical analyst and was subsequently promoted to director of rates and assistant vice president. A graduate of Boston College, he holds a master's degree from WPI.

Rosemary Murphy O'Brien entered Tufts University Graduate School in September to study chemical engineering. For the past two years, she has been with Critical Fluid Systems at A.D. Little.

Michael Parulis is a nuclear construction engineer for the General Dynamics Electric Boat Division in Groton, CT.

Cathryn Ricci serves as a packaging engineer at Digital Equipment Corp., Hudson, MA.

Matthew Rubano is an associate engineer at Northeast Utilities, Hartford, CT.

Peter Sherer is employed as a machine design engineer at Kodak, Rochester, NY.

Richard Stephens was recently promoted to regional sales manager of the fluid drives and controls division for the Northeastern part of the U.S. at Dana Industrial Group, Paramus, NJ.

Thomas Storey is now a fire protection engineer at Public Service Electric & Gas, Hancocks Bridge, NJ.

James Sweeney, III, is employed as a systems analyst in GE's Energy Applications Program Department, Schenectady.

Alan Weeks works for GE's Mechanical Drive Turbine Department in Fitchburg, MA.

William Woishnis is a manufacturing engineer at Hewlett-Packard in Palo Alto, CA.

John Zagorski is a PhD candidate in the department of biochemistry at the University of Massachusetts in Amherst.

1981

MARRIED: John F. Brady, 3rd, and Anne Pepe on April 16, 1982. The bride graduated from Immanuel College with a BS in political science and Spanish. She holds a teaching certificate in elementary education. Brady is employed as an electrical engineer at Texas Instruments, Dallas. . . . **John T. Eagan, Jr.,** and Marie A. Wooley in New Milford, CT, on May 1, 1982. Mrs. Eagan, who is with a Dallas, TX, real estate firm, graduated from New Milford High School. The groom is a mechanical design engineer at Texas Instruments, Dallas. . . . **Ralph Malboeuf** and Diane M. Motta in Provincetown, MA, on May 1, 1982. Mrs. Malboeuf graduated from Becker. He is an electrical engineer in Long Island, NY, and is also studying for his master's degree at Hofstra University.

James R. Morin and Darcy A. Boyea in Marlborough, NH, on May 21, 1982. The bride graduated from Bay Path Junior College, Longmeadow, MA, and is a legal secretary in Milford. Her husband serves as a manufacturing engineer in Milford at Hitchner Manufacturing Co. . . . **Gregory J. Phipps** to Ingrid I. Rasmanis in Providence, RI on May 1, 1982. The bride graduated from the University of Rhode Island and works for Data Resources, Inc., Lexington, MA. Phipps is an applications engineer at Automatix, Inc., Burlington.

Doug Anderson serves as a test and service field engineer for Koppers Co. in Baltimore.

Donald Calawa continues as a graduate assistant in the electrical engineering department at WPI.

Thomas Connerton serves as a project manager at Topper & Griggs Steel Co., Inc., Plainville, CT.

Jeanne Coughlin has been employed as a junior process engineer at IBM in Endicott, NY.

Mark Feeney has joined Daniel O'Connell's Sons, Inc., Holyoke, MA.

Jorge Garcia is with Texaco, Inc. of Panama.

Edward Gonsalves works for Texas Instruments, Attleboro, MA.

Robert Gottberg serves as an associate engineer at IBM in Poughkeepsie, NY.

Webb Grouten, Jr., is a field planning engineer at Stone & Webster in Piketon, OH.

Waleed Hajjar works as a senior engineer for Advanced Technology Lab., Bellevue, WA.

Robert Hevey, Jr., is an associate engineer at Electric Boat in Groton, CT.

Ladan Homayoon, who is studying for his master's degree in engineering, is a teaching assistant at Cornell University, Ithaca, NY.

Thomas Hyrniewicz serves as a programmer for Donnelley Marketing Information Services in Stamford, CT.

Charles LaBrec is a teaching assistant in the physics department at Purdue University in West Lafayette, IN.

Cynthia Lozeau is with Corning Glass Works, Corning, NY, where she is employed as a mechanical engineer.

Dr. **Paul McLaughlin** is a senior analytical chemist with Sterling Drug, Rensselaer, NY.

John Norton is a chemical engineer at the Naval Ordnance Station, Indian Head, MD.

Michael Patz is a research associate at New England Nuclear, North Billerica, MA.

Jeffrey Petraitis is employed as a product design engineer at Texas Instruments in Attleboro, MA.

Stuart Ross is employed as a project engineer at CBS Technology Center, Stamford, CT.

Stanley Siver serves as a naval aviation intelligence officer for the U.S. Navy.

David Thompson works as a lab technician at Riogen, Cambridge, MA.

Marc Trudeau is a sound engineer at Peavey Electronics, Inc. in Meridian, MS.

Thomas Weaver serves as a scientific programmer at Cabot, Billerica, MA.

Mark Wilcox is a systems engineer at IBM in Hartford, CT.

1982 WPI Alumni Directory

An up-to-date listing of all living alumni, including their residence and business addresses, is available by contacting:

WPI Alumni Office
Institute Road
Worcester, MA 01609
(617) 793-5600
The cost is $13.95 postage paid.

1982

MARRIED: Arthur P. Christian, 2nd, and Diane M. Caswell on June 12, 1982 in Suffield, CT.

Ronald Alexander has been employed as a software engineer at Prime Computer, Inc., Framingham, MA.

The Foxboro Co., Foxboro, MA, has hired **Glen Bashian** as an electronic product engineer.

Jane Bebar is with IBM in Endicott, NY.

Thomas Berard serves as a management trainee at New England Telephone, Boston.

Craig Brock has joined Hamilton Standard, Windsor Locks, CT.

Jane Bulejcik is now with EUA Service Corp., Lincoln, RI.

Digital Equipment Corp., Tewksbury, MA, has employed **James Cahill** as a software engineer.

Brian Chase works as a field engineer at Turner Construction Co., Boston.

Deborah Chichlowski is currently a quality engineer at Digital Equipment Corp., Westminster, MA.

Carl Cianci works for Electric Boat, Groton, CT.

Scott Connally has been named a member of the technical staff at Hughes Aircraft Co., Fullerton, CA.

Terry Crook has joined Hamilton Standard, Windsor Locks, CT as a field service engineer.

Martin Curry is now a project engineer at Procter & Gamble, Cincinnati, OH.

Lynne D'Autrechy has been named a member of the technical staff at Bell Laboratories, Piscataway, NJ.

James Diemer is a research assistant in the CE department at the University of Illinois in Urbana.

Lawrence Donohue, Jr., is a manufacturing engineer at the Torrington (CT) Co.

Robert Edwards is with the ground systems group at Hughes Aircraft Co., Fullerton, CA.

Currently, **Richard Ferron** is a teaching assistant at WPI.

Gregory Fitzgerald has joined the Sylvania Systems Group, Communication Systems Division, at GTE in Needham Heights, MA.

Eric Fredrickson works for GE in Waterford, NY.

Cynthia Gagnon has joined Bell Laboratories in Holmdel, NJ.

Sharyn Germata works as a cost analyst at Chase in Westboro, MA.

Michele Giard is employed at Exxon in Houston.

Stephen Griffin holds the post of design engineer at Hamilton Test Systems in Tucson, AZ.

Jeffrey Gross has joined Intel Corporation in Chandler, AZ.

Edward Hinton is a member of the technical staff at Wang Labs, Inc., Lowell, MA.

Richard Hoft serves as a design engineer at Microwave Associates.

John Iannarone is employed by Digital Equipment Corp., Tewksbury, MA.

Michael Iassogna has joined Du Pont, Wilmington, DE, where he is a project engineer.

David Johnson is now concerned with business installations at New England Telephone in Worcester.

Stuart Joseph has joined Yankee Atomic Electric Co., Framingham, MA.

Peter Kearney serves as a test engineer at Analog Devices, Wilmington, MA.

Jolanta Klepacz is an industrial engineer at Kodak, Rochester, NY.

Michael LaFleur has joined Tau-Tron in Chelmsford, MA.

State Mutual, Worcester, has employed **Robert Mitchell** as a student actuary.

Stephen Morgan is now with Pratt & Whitney Aircraft, Hartford, CT.

Thomas Neale works as an electronic engineer at Intel Corp., Santa Clara, CA.

Robert Neville is a nuclear engineer at Palo Verde Nuclear Generating Station, Phoenix, AZ.

Richard Nicholson works for Sanders Associates, Nashua, NH.

Kevin Nute, an electronic engineer, is also with Sanders Associates.

Lynne Ondek is in the advanced engineering program at Honeywell Small Systems and Terminals Division, Billerica, MA.

Richard Petrucci has joined Stone & Webster, Boston.

Bell Labs, Piscataway, NJ, has employed **Ronald Pettit** as a member of the technical staff.

William Poe is enrolled at Tufts University School of Medicine, Boston.

Mark Ramberg has begun work at Teradyne Co., Boston.

Chris Reeve serves as an associate industrial engineer at Data General in Southboro, MA.

Marc Yaffe is now in pilot training at Vance AFB in Oklahoma.

SCHOOL OF INDUSTRIAL MANAGEMENT

MARRIED: Jeffrey B. Ray, '78, and Debra L. Sutcliffe in Shrewsbury, MA, on April 3, 1982. The bride, a graduate of Leo's Beauty Institute, Worcester, is a hairdresser. Her husband graduated from Nathaniel Hawthorne College,

Antrim, NH, and holds the post of vice president of Barco Mfg., Inc., Worcester.

Stephen McCabe, '64, has been elected vice president of operations at Armatron, International, Inc., a publicly-owned company in Melrose, MA. The firm manufactures electronic bugkillers and electric log-splitters, radios for tractors and buses, satellite TV receivers and CB and amateur radio antennas. McCabe has directed operations at Armatron since 1979. During his 22-year career at Norton Company, he was a director of operations and manager of manufacturing.

John McCarthy, '65, has been appointed director of management information systems at Wyman-Gordon Co., Worcester. Responsible for systems and data processing at all company plants, he joined the company in 1956 and has worked in several data processing jobs. Most recently, he was manager of systems for the eastern division. . . . **Ralph Bednarik, '74,** has also been promoted at Wyman-Gordon. Currently, he serves as manager of operations of the eastern division at the Grafton plant.

NATURAL SCIENCE PROGRAM

Arthur Gage, '72, continues as a physics teacher at Agawam (MA) High School. He and his wife, Margaret, have two children. . . . In June, **Peter Johnson, '78,** who taught high school biology in Attleboro, MA, for seven years, became a medical doctor in graduation ceremonies at the University of Massachusetts. The father of three quit teaching full-time in 1978 to go to medical school. He helped support his family with a string of part-time jobs. Now, Johnson plans to go into internal medicine.

COMPLETED CAREERS

Correction: We reported erroneously in the August *Journal* that **A. Hugh Reid, '11,** and **James K. Healy, '35,** had passed away recently. Both are alive and well. In fact, Mr. and Mrs. Hugh Reid recently celebrated their 70th wedding anniversary! We sincerely regret any distress or inconvenience which this misprint may have caused these alumni, their families or friends.

Mrs. **Esther Kisk Goddard,** widow of Dr. **Robert H. Goddard, '08,** America's pioneer rocket scientist, died at her home in Worcester on June 5, 1982. She was 81 years old.

Dr. Goddard, who launched the world's first liquid fuel rocket, died in 1945. Following his death, Mrs. Goddard, a Worcester native, edited his papers, obtained patents on many of his inventions and lectured and traveled worldwide to receive honors on his behalf.

After attending Bates College, Mrs. Goddard graduated from Johns Hopkins University and Clark University. Later she became secretary to the president of Clark, where she met her future husband and assisted him during his earliest experiments in rocketry. In 1966 she was honored as the "first missile-tracking photographer" by a chapter of the Society of Photo-Optical Instrumentation Engineers.

Others honors included: "Woman of the Year" (Worcester Business and Professional Women's Club), "Mrs. Goddard Day" (WPI), honorary membership in the American Rocket Society and degrees from Clark University, Anna Maria College and the University of Maryland. In 1969, she became the first woman ever awarded an honorary doctor of science degree from WPI.

Charles F. Goldthwait, '09, one of the country's premier textile chemists, died in Pittsburgh, PA, on April 29, 1982. He was 96.

During his career he was with Klearflax Linen Looms and Baltimore Processing Co. and served as a senior industrial fellow at Mellon Institute, Pittsburgh. Also, he was with the South Regional Research Lab, USDA, in New Orleans and a visiting professor at North Carolina State College in Raleigh.

Until four years ago, he performed research on virtually all natural and man-made fibers. His final articles appeared in the official journal of the American Association of Textile Chemists and Colorists, of which he was a charter member. He developed a semi-elastic cotton gauze bandage for military use which is now commercially available.

Four times he was honored for his work with the USDA. He was the inventor of the differential dye test for maturity and processing quality of cotton fiber in the boll. In "retirement" at North Carolina State, he developed stretch cotton fabric—of considerable importance to cotton manufacture in this country.

John J. Desmond, '14, of Rochester, NY, passed away on April 28, 1982 at the age of 91.

Graduated as a chemist from WPI, he worked for the Henry Souther Engineering Co. and Bridgeport Brass Co. and served in the U.S. Army from 1917 to 1919. From 1919 to 1955 he was with North East Electric Co., where he rose to chief chemist and metallurgist, staying with the firm as Delco appliance division director when General Motors acquired North East.

Mr. Desmond was a life member of the American Society for Metals, and a past president of the Rochester chapter, as well as a past member of the American Chemical Society. He had served as president of the Rochester chapter of the WPI Alumni Association and as WPI Council representative from 1953 to 1958. A native of Fall River, MA, he was born on May 3, 1890.

John M. Bond, '15, of Lakewood, NJ, died on March 3, 1982.

A native of Providence, RI, "Jig" was born on April 23, 1892. Graduated as an electrical engineer, he worked a short time for American Steel & Wire, Worcester. Other employers were National Carbon Co., Westinghouse and the New York City Transit Authority.

During his career, he developed and patented an electric snow melter for track switches which became a standard device in subway systems. In 1918 and 1919 he served with the U.S. Naval Reserve and was assigned to the Experimental Station in New London, CT, developing anti-submarine devices.

A member of Phi Sigma Kappa, Mr. Bond also belonged to the New York Railroad Club, AIEE and the American Electric Railway Association.

Warren W. Parks, '17, WPI trustee emeritus, died in Cincinnati, OH, on August 5, 1982.

Born in Russell, MA, on February 14, 1896, he received his BSCE in 1917. Later he was with Durkee, White & Towne, Boston & Albany Railroad and Fay, Spofford & Thorndike. From 1943 to 1966, he was village manager of Indian Hill, OH.

As a former resident engineer of the town of Mariemont, he was responsible for the building of one of the first English-Norman style churches erected since the 12th Century.

Besides serving as a church trustee, Mr. Parks provided leadership in many professional societies. In 1961 he was named Engineer of the Year by the Technical and Scientific Societies Council of Cincinnati. He was a past director of ASCE (life member) and past president of the Ohio Municipal League. He was an honorary member of Tau Beta Pi and the father of Russell Parks, '41.

Arnold H. Woods, '18, a former insurance executive, died on June 3, 1982 in Allentown, PA, at the age of 85.

A civil engineer, he joined the State of Illinois Highway Department. Later he was employed by the Stock Co. Inspection Bureau and Improved Risk Mutuals. In 1945 he founded the former Arnold H. Woods Insurance Agency in Allentown.

Mr. Woods belonged to the Society of Fire Prevention Engineers and Tau Beta Pi. He was a past president of the Lehigh Association of Insurance Agents in Allentown and an original member of the Certified Property and Casualty Underwriters. During World War I he served as an officer in the U.S. Navy. He was born on May 16, 1897 in Lunenburg, MA.

Percy G. Sharpe, '20, died on April 18, 1982 in Atlantis, FL. He was 83 years old.

A native of Ware, MA, he was employed for 42 years by the Marlboro Savings Bank, which he served as assistant treasurer. He retired in 1968. He belonged to the Baptist Church and the Masons.

Lawrence K. Hyde, '22, of Gladwyne, PA, formerly the assistant to the vice president of Baldwin-Lima-Hamilton Corp., died suddenly on June 3, 1982. He was born on April 6, 1901 in Westfield, MA.

During his career, he was with the National Bureau of Standards and O.S. Peters Co. (president), Washington, DC, and McCollum Exploration Co., Houston, TX. For 30 years he was employed by Baldwin-Lima-Hamilton Corp., Waltham, MA. After retirement from the latter firm, he served as manager of the Testing Machine Division at Wiedemann Machine Co. in King of Prussia, PA.

Mr. Hyde belonged to ATO and earned his BSME at George Washington University. Other memberships included Sigma Tau, ASM, ASTM, ISA and the Washington Society of Engineers. He was a registered professional engineer in Washington, DC. He was a former

vice president of Civitan International (DC), a past president of the Washington chapter of the WPI Alumni Association and the father of **John Hyde, '56.**

Donald McAllister, '23, of Palos Verdes Estates, CA, a former employee of Robertshaw Controls, died on March 28, 1982.

He was born on May 8, 1902 in Adams, MA, and received his BSME from WPI, where he belonged to ATO and Skull. He worked for T.K. McAllister & Co., and General Fibre Box Co., both of Springfield, MA, as well as Worthington Pump of Holyoke. Other employers were North American Aviation and Grayson Controls in California. He was retired from Robertshaw Controls of Long Beach. An Army veteran, he rose to the rank of major.

Harold P. Latimer, '25, a long-time employee of Simonds Saw & Steel, Fitchburg, MA, passed away on January 31, 1982.

A graduate mechanical engineer, he joined Simonds, where he retired as a sales engineer in 1960. Later he was with Industrial Supplies, Inc.

Mr. Latimer, a 32-degree Mason and Shriner, belonged to Phi Sigma Kappa and Skull. He resided in Laguna Hills, CA, and was born on February 12, 1903 in Leominster, MA.

Paul R. Nelson, '30, a former control engineer at Norton Co., died on June 15, 1982 in Cape Cod Hospital, Hyannis, MA. He was 79.

He received his BSEE from WPI. For 35 years, until his retirement in 1960, he was with Norton Co., Worcester, which he served as a manufacturing control engineer.

Mr. Nelson was born on November 27, 1902 in Worcester. Besides attending Bates College, Lewiston, ME, he did graduate work at Boston University. He belonged to Phi Sigma Kappa, the Norton 25-Year Club and the Norton Foreman's Club. He was past master of Montacute Masonic Lodge.

Warren N. Doubleday, '31, Quabbin Reservoir historian, died at his home in New Salem, MA, on May 2, 1982 at the age of 72. He was born in North Dana, MA, on February 8, 1910.

Graduated as an electrical engineer, from 1934 to 1937 he was an engineer for the Quabbin Reservoir project, in which his hometown, North Dana, was flooded. Prior to his retirement in 1972, he was a civilian employee for the Department of Defense Air Force Eastern Communications Region.

Mr. Doubleday was a well-known Quabbin Reservoir historian. He often lectured about pre-flood days in the area and had memorabilia which he displayed. A past president of the Swift River Valley Historical Society, Mr. Doubleday had also been a trustee of New Salem Academy and a member of the Congregational Church, the Masons and Lambda Chi Alpha.

Manning Holoff, '33, president of Manning Holoff Co., manufacturers of Magna-Lite, Los Angeles, CA, passed away on March 28, 1982.

A Worcester native, he was born on March 27, 1911. After graduating as a mechanical engineer from WPI, his employers included Pratt & Whitney and Ranger Aircraft. In World War II he was chief production engineer with Rolls Royce, then works manager at Indian Motorcycle in Springfield, MA, and production manager with McCulloch Motors in California.

Later he formed Holoff Construction Co., and built custom homes in the Los Angeles area. In the 1970s he developed Magna-Lite, an improved lighted magnifying glass, and founded his own firm to manufacture the product. Recently he designed a large reader now sold worldwide.

William F. Atwood, Jr., '36, formerly of Waltham, MA, died recently.

He was born on July 27, 1913 in Waltham. During his career he was with General Dyestuff Corporation, Boston, D.E. Cummings Co., Newport, ME, and Pacific Mills, Lawrence, MA. Also he worked for the Boston Naval Shipyard and the Philadelphia Naval Shipyard. He received his BS from WPI in 1936.

Marvin Handleman, '41, a retired chief engineer for the American Forces Network in Berlin, West Germany, died in Hyannis, MA, on June 17, 1982. He was 63 years old.

Mr. Handleman was born on August 6, 1918 in Paxton, MA. In addition to WPI, he attended the RCA Institute in New York City. During World War II, he was in the U.S. Army Signal Corps in Europe. From 1946 to 1948 he was with his family's real estate management business. Later he joined Radio Free Europe as an electronics engineer and then the American Forces Network in Berlin as chief engineer. He belonged to the Institute of Radio Engineers and the IEEE.

Stanley S. Ribb, '41, the recently retired president of Blackstone Valley Electric Co., died in Pawtucket, RI, on June 4, 1982 at the age of 64.

An electrical engineer, he joined General Electric, staying with the firm until 1959, when he went with Blackstone Valley Electric. In 1961 he was named chief engineer, in 1968, vice president and in 1971, president.

Mr. Ribb was a native of Worcester and a member of Sigma Xi. He belonged to the Rotary Club, the Masons, the Rhode Island Commodores, the Providence Engineering Society and the Electrical League of Rhode Island.

Active with the Boys' Club and Community Library Association, he was also a past chairman of the Providence AIEE section and a former vice president of the Rhode Island chapter of the WPI Alumni Association. During World War II he was with the U.S. Navy.

John H. Quinn, Jr., '42, of Santa Rosa, CA, passed away recently.

He was born on July 19, 1920 in Fitchburg, MA. After receiving his BSME, he joined NACA, Langley Field, VA, as an aerodynamics research scientist. Later he was employed by Chance Vought Aircraft and Temco Aircraft. After leaving Lockheed Missiles & Space Co., Sunnyvale, CA, and Martin Co., Denver, he went with McDonnell-Douglas Astronautics from which he retired in 1976 following 34 years of continuous employment in aerospace.

One of the highlights of his career came when he helped load the first Polaris submarine.

Frank S. Jurczak, '50, died unexpectedly on June 10, 1982 in New Britain (CT) General Hospital. He was 58 years old.

Before retiring in 1981, he had been employed by United Technologies Corp. and its subsidiaries for 31 years. While with the firm, he served in various capacities, including test engineer for Pratt & Whitney Aircraft, East Hartford and as manager of control systems at Turbo-Power & Marine, Inc., Farmington.

He was a past grand knight for the Knights of Columbus. Besides being involved with Scouting, he belonged to Phi Kappa Theta, Tau Beta Pi, Sigma Xi and the ASME. He was a World War II Army veteran, was born on December 16, 1923 in New Britain, CT, and received his BSME from WPI.

John E. Leach, '53, class head agent, died of an apparent heart attack at his home in Fort Madison, IA, on May 29, 1982.

He had been plant manager for Du Pont in Fort Madison for the past six years, having originally joined Du Pont in 1953 in Philadelphia. During his career with the company he held numerous manufacturing and technical assignments. He was mainly involved with making paint and allied polymers.

Recently, Mr. Leach was instrumental in Du Pont's donating land for a proposed Fort Madison branch library. He was also a member of Sigma Phi Epsilon, the Elks and the local country club. A native of Rockingham, VT, he was born on October 3, 1931. He received his BSCE from WPI in 1953 and then served with the U.S. Army.

Lt. Col. **Thomas J. Merchant, SIM'62** U.S. Army Ret., died June 23, 1982 in Worcester at age 60.

He was born in Westboro, MA, graduated from Wentworth Institute and did graduate work at WPI, Holy Cross and MIT. Since 1949 he had worked for Bay State Abrasives, Westboro, MA, where he was an environmental and safety coordinator.

Mr. Merchant was a veteran of the U.S. Army Corps of Engineers and saw action in World War II and Korea. He belonged to the American Society of Safety Engineers, the Reserve Officers Association (DC) and several other military, church and community organizations. He had belonged to the Westboro town advisory board and had served as chairman of the board of selectmen.

Roger W. Williams, '65, a long-time employee of General Electric Co., died at his home in Lunenburg, MA, on May 21, 1982 at the age of 44.

After graduating from the University of Maine, he received his MSME from WPI. He worked for 22 years as a mechanical engineer at the GE plant in Fitchburg and was the recipient of the GE Electric Power Systems Sector Award in 1979.

Mr. Williams was also affiliated with Tau Beta Pi, the ASME and the Elfun Management Association and was a registered engineer and land surveyor in Massachusetts. He was born in Westbrook, ME.

Joel S. Schoenholtz, '68, of Upper Saddle River, NJ, passed away in May.

A native of New York City, he was born on March 24, 1945. He graduated as a civil engineer from WPI. During his career, he had been with Bethlehem Steel and Custom Chemical Co., Elmwood Park, NJ, where he was plant manager. He belonged to AEPi and Skull.

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Whether you're stuffing stockings or stocking up for reunion or homecoming, the Bookstore is your purveyor of dozens of WPI items for you, your family and friends. Form and function combine tastefully in these attractive reminders of your membership in the WPI community. To avoid delay, order now.

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Black with gold trim and WPI seal.
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(Child's jogging suit is described on the following page.)

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Civil Engineer's Handbook
List price $55.00
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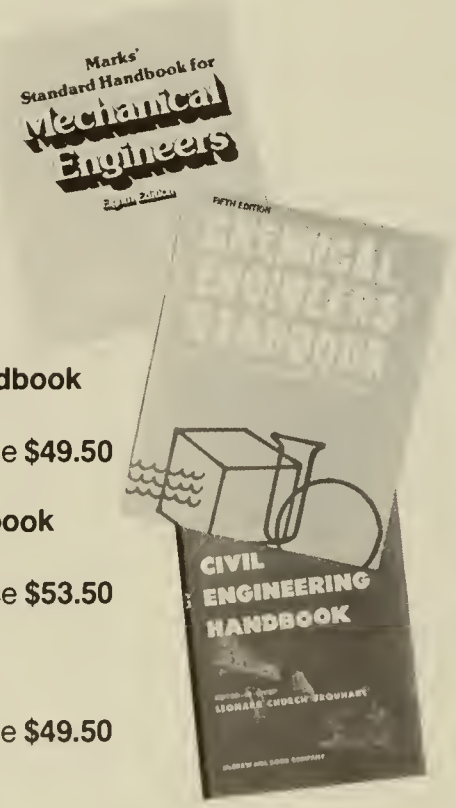

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Paperweight
Gold-plated seal with red and white enamel detail, mounted on 2" x 2" x ¾" Carrara marble with cork base.
Item **105** **$3.50**

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Item **106** **$17.95**

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Ceramic items decorated with multi-colored WPI seal.

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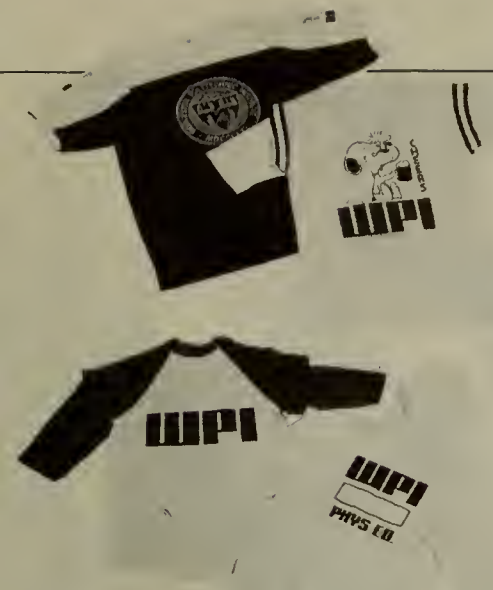
B. 1½ oz. Mini-mug **$2.95**
C. 32 oz. Jumbo **$9**
D. 24 oz. Classic **$8**

E. Salt & Pepper shakers **$4.95 p**

Ashtrays
Glass with 24kt gold and red WPI seal.

F. 8" size **$4.00**
G. 4" size **$1.95**



Shirts

Hooded Sweatshirt
50% creslan, 50% cotton. White with maroon design. S-M-L-XL
Item **122** **$15.50**

Football Jersey
Stretch nylon knit navy mesh body with white yolk and gold seal. S-M-L-XL
Item **107** **$9.50**

Snoopy Jersey
Interwelt knit, 100% combed cotton. Multi-colored design. S-M-L-XL
Item **108** **$11.50**

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50% cotton, 50% polyester. Natural/red. S-M-L-XL
Item **120** **$7.75**

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Teddy Bear
Approx. 9" tall
Item **109** **$6.95**

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Item **110** **$6.95**

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Item **111** **$7.25**

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Size 12" x 30"
Item **103-A** **$5.95**
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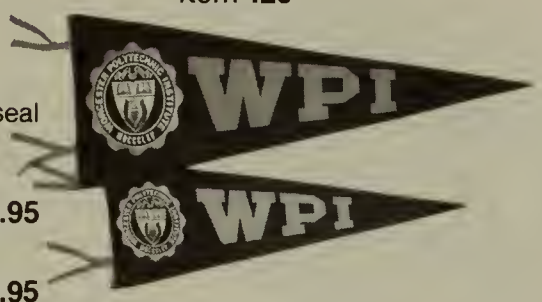
Item **103-B** **$4.95**



Jogging Suits

Child's Jogging Suit
Maroon with white trim, cotton/polyester.
Sizes—12 mos., 14 mos.
2T (27-32 lbs) and 4T (33-37 lbs.)

Hooded sweatshirt (not shown)
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Item **124** **$5.50**

ssware decorated with 24kt gold and red WPI seal.

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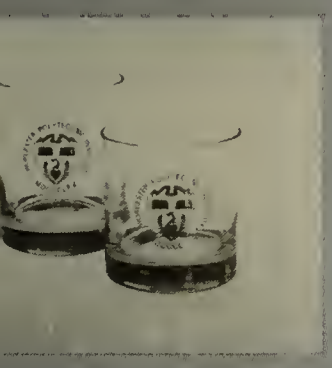
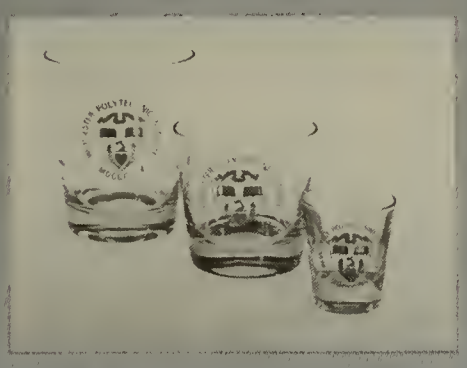
K. 4½ oz. Whiskey Sour **$3.25**
L. 6½ oz. Wine **$3.50**



15 oz. Executive **$2.70**
11 oz. Executive **$2.50**



O. 15 oz. Dble. Old Fashioned **$2.70**
P. 9 oz. Old Fashioned **$2.25**
Q. 1½ oz. Shot Glass **$1.55**

R. 15 oz. Roly-poly **$2.70**
S. 11 oz. Roly-poly **$2.50**

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CLASS OFFICERS

Class	President	Secretary
1912	J. Francis Granger	
1913		
1914		Ellwood N. Hennessy
1915	Frank Forsberg	
1916		C. LeRoy Storms
1917	Glendon M. Pomeroy	
1918	Walter B. Dennen	John F. Kyes, Jr.
1919	Judah H. Humphrey	
1920		
1921		Robert E. Chapman
1922	Wayne E. Keith	Phillip H. White
1923		
1924	E. Herbert Higgins	
1925	Carl F. Carlstrom	Daniel L. Hussey
1926	Archie J. Horne	Raymond H. Bjork
1927	Clifford I. Fahlstrom	William M. Rauha
1928	Andrew L. Wilkinson	Gifford T. Cook
		Theodore J. Englund
1929	Arthur W. Knight	Holbrook L. Horton
1930	Daniel F. O'Grady	Carl W. Backstrom
1931	Ralph Hodgkinson	Edward J. Bayon
1932	Paul E. Nelson	Olof W. Nyquist
1933		Sumner Sweetser

"Adding two numbers which probably have never been added before is not considered a mathematical breakthrough."

1934	Everett F. Sellew	Howard A. Whittum
1935	C. Marshall Dann	Raymond F. Starrett
1936	Donald L. Edmunds	Harold F. Henrickson
1937	William E. Carew	Richard J. Lyman
1938	Richard F. Burke	Walter E. Knapp
1939	Albert J. Raslavsky	
1940	Raymond J. Forkey	Robert E. Dunklee, Jr.
1941	Donald E. Smith	Russell W. Parks
1942	Homer R. Arey	Roy Bourgault
1943	Edward H. Peterson	
1944	Irving J. Donahue, Jr.	John G. Underhill
1945	Robert E. Scott	
1946	Carl F. Simon, Jr.	M. Daniel Lacedonia
		George H. Conley
1947	John G. Hambor	
1948	James G. McKernan	Paul E. Evans
1949	James S. Adams	Howard J. Green
1950	Henry S.C. Cummings, Jr.	Lester J. Reynolds, Jr.
1951	Richard E. Ferrari	Stanley L. Miller
1952	Harold R. Althen, Jr.	Edward G. Samolis
1953	David G. Holmes	David S. Jenney
1954	David F. Gilbert	Roger R. Osell
1955	Peter H. Horstmann	Ralph K. Mongeon, Jr.
1956	Henry W. Nowick	Rev. Paul D. Schoonmaker
1957	William C. Rogler	Robert A. Yates
1958	Robert S. Jenkins	Harry R. Rydstrom
1959	Donald R. Ferrari	Frederick H. Lutze, Jr.
1960	Fidele L. DiPippo	Paul W. Bayliss
1961	Richard S. Adler	John J. Gabarro
1962	Richard J. DiBuono	Harry T. Rapelje
1963	William C. Zinno	Robert E. Maynard, Jr.
1964	Barry J. Kadets	David T. Signori, Jr.
1965	Patrick T. Moran	John P. Jacobson
1966	Lawrence A. Penoncello	John G. Dyckman
1967	Raymond C. Rogers, Jr.	John L. Kilguss
1968	Arnold J. Antak	Charles A. Griffin
1969	Peter T. Grosch	Roger W. Miles
1970	Leonard Polizzotto	F. David Ploss, III
1971	Donald P. St. Marie	Vincent T. Pace
1972	John Zorabedian, Jr.	John A. Woodward
1973	David Hubbell	Jay J. Schnitzer
1974	William A. Delphos	James F. Rubino
1975	Patricia Graham Flaherty	James D. Aceto, Jr.
1976	William K. Johnson	Paula E. Stratouly
1977	Raymond A. Baker	Kathleen E. Molony
1978	Richard R. Poole	Cynthia A. Grynick
1979	Lawrence P. Marino	James E. Manchester
1980	Christopher C. Dennison	Mark F. Riley
1981	Frederick D. Rucker	William C. Alexander
1982	Matthew J. Flynn	Ann Marie Noga

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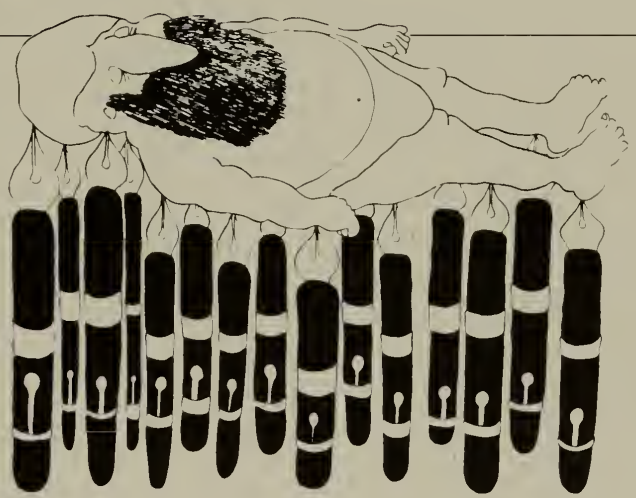
Equation Fluency Test

This test does not measure your intelligence, your fluency with words, and certainly not your mathematical ability. It will, however, give you some gauge of your mental flexibility and creativity. In the years since the test was developed, we've found few people who could solve more than half the 24 questions on the first try. Many, however, reported getting answers long after the test had been set aside—particularly at unexpected moments when their minds were relaxed, and some reported solving all the questions over a period of several days. Take this as your personal challenge.

Instructions: Each equation contains the initials of words that will make it correct. Finish the missing words. For example: 26 = L. of the A. would be 26 = Letters of the Alphabet. Correct—at least plausible—answers appear below.



Ralph Brown, Jr.

a. 26 = L. of the A. _____

b. 7 = W. of the A.W. _____

c. 1001 = A.N. _____

d. 12 = S. of the Z. _____

e. 54 = C. in a D. (with the J.) _____

f. 9 = P. of the S.S. _____

g. 88 = P.K. _____

h. 13 = S. of the A.F. _____

i. 18 = H. of a G.C. _____

j. 32 = D.F. at which W.F. _____

k. 90 = D. in a R.A. _____

l. 200 = D. for P.G. in M. _____

m. 8 = S.S. on a S.S. _____

n. 3 = B.M. (S.H.T.R.) _____

o. 4 = Q. in a G. _____

p. 24 = H. in a D. _____

q. 1 = W. on a U. _____

r. 5 = D. in a Z.C. _____

s. 57 = H.V. _____

t. 11 = P. on a F.T. _____

u. 1000 = W. that a P. is W. _____

v. 29 = D. in F. in a L.Y. _____

w. 64 = S. on a C. _____

x. 40 = D. and N. of the G.F. _____

a. 26 = Letters of the Alphabet
b. 7 = Wonders of the Ancient World
c. 1001 = Arabian Nights
d. 12 = Signs of the Zodiac
e. 54 = Cards in a Deck (with the Jokers)
f. 9 = Planets of the Solar System
g. 88 = Piano Keys
h. 13 = Stripes of the American Flag
i. 18 = Holes of a Golf Course
j. 32 = Degrees Fahrenheit at which Water Freezes
k. 90 = Degrees in a Right Angle
l. 200 = Dollars for Passing Go in Monopoly
m. 8 = Straight Sides on a Stop Sign
n. 3 = Blind Mice (See How They Run)
o. 4 = Quarts in a Gallon
p. 24 = Hours in a Day
q. 1 = Wheel on a Unicycle
r. 5 = Digits in a Zip Code
s. 57 = Heinz Varieties
t. 11 = Players on a Football Team
u. 1000 = Words that a Picture is Worth
v. 29 = Days in February in a Leap Year
w. 64 = Squares on a Checkerboard
x. 40 = Days and Nights of the Great Flood

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

FEBRUARY 1983

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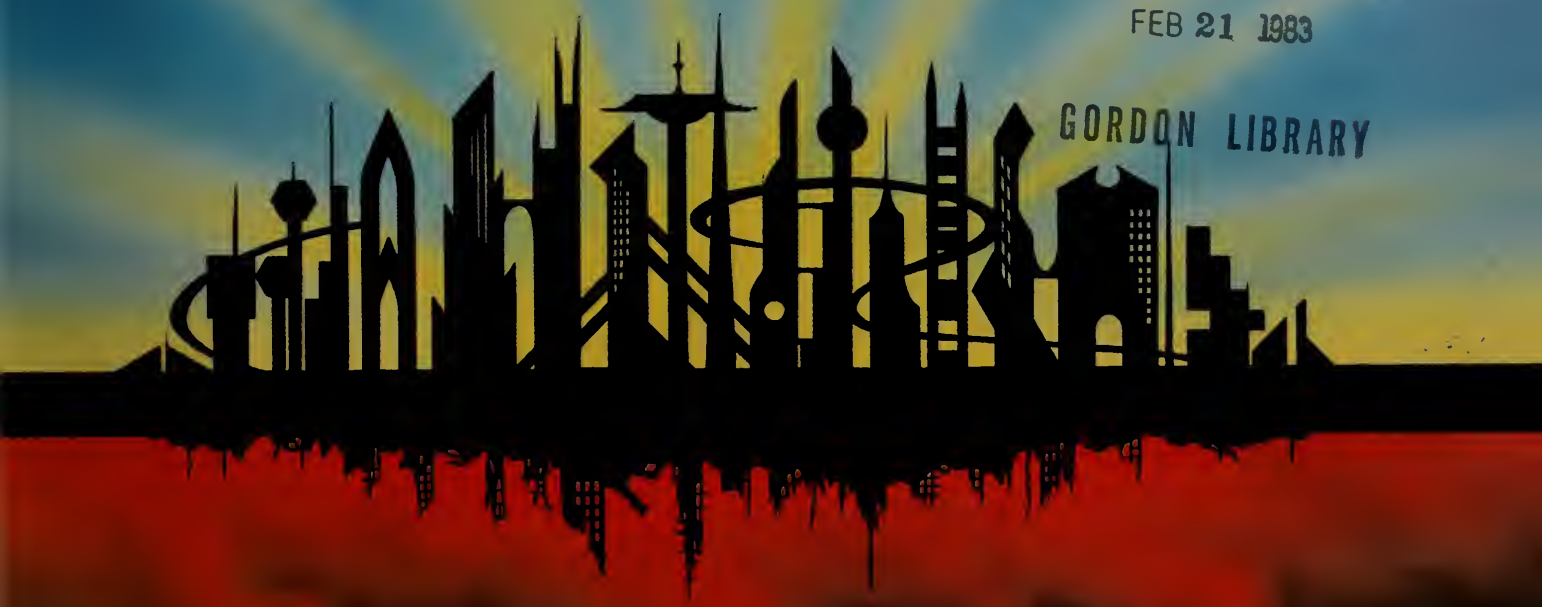

Somewhere between a gleaming Tomorrow-land and a red-hot cinder lies the likely future of the globe. But where? What will shape that future? Can human beings evade their own preconceptions well enough to guess?

Robots Invade WPI
The Inside Story

A MESSAGE

The WPI Alumnus: A Special Breed

A message from Peter H. Horstmann, '55, President, WPI Alumni Association

It isn't every day that an engineer-turned-businessman gets an opportunity to author an article for the WPI *Journal*, and it's a double blessing when the subject is one of my favorites—the WPI Alumni Association. Let me share with you our objectives for the current year and my sense of strength and vitality in our alumni organization.

An integral part of the excellence that surrounds WPI is its alumni body. At 15,000 strong and growing, we are by far the largest group within the college community. We are amazingly diverse and ever-changing. More than 300 women now call WPI their alma mater. Engineers—or technological humanists, as the Plan now defines them—still predominate, but our breadth extends to doctors and dentists, presidents and professional athletes, consultants and legislators.

Judging by our achievements, WPI has indeed educated us well for professional, as well as community and personal, life. Our alumni not only design, develop and build around the world, we also start successful businesses, make scientific discoveries, lead major corporations, and generally display our talents in all sorts of ways. We are a group of contributors—to business and industry, to science and technology, to our communities and volunteer agencies, and, of course, to our college. It's a record to be proud of.

The Alumni Association exists to serve the needs of alumni, and in so doing to benefit the college. These needs range from a general desire to remain involved and in touch with college affairs, to more specific expressions of interest and commitment.

The annual objectives and long-range goals of the Association are designed to meet these very needs. For 1982–83, your Association has established the following objectives:

1. To promote growth and development of regionally oriented programs, including Regional Clubs and the Corporate Contacts and Alumni Admissions programs. This focus on regional programs is a direct result of widespread alumni interest and is intended to exploit the regional commonality among the several programs to their collective benefit.
2. To enhance the image and profile of WPI alumni. For many years, and in many ways, our alumni have expressed a feeling that, as WPI alumni, we do not always experience the same degree of respect and recognition of excellence that the college itself does. In fact, the general public is not always as aware of WPI's excellence as it could be. Our intention is to help shine a brighter light on both our alumni and our college.
3. To study the organization of our Alumni Office, identifying staff and organizational needs for the future.
4. To surpass the $1-million mark in this year's Alumni Fund.
5. To maintain the excellence of all Association programs and to evaluate objectively the contributions of each.

By any standard, these are ambitious objectives. They demand our best efforts in order to succeed. I have no doubt, however, that we are dealing from a position of strength as we endeavor to reach these goals. Our Association and its programs have made tremendous strides in recent years, to the point where we now play in the major leagues of alumni organizations.

Well over 2,000 alumni volunteers work actively on behalf of the Association. A total of 6,000 of us either volunteer or participate in one or more of our programs. Last year alumni contributions to the college exceeded $800,000, and we are responsible, directly and indirectly, for distributing more than $150,000 in undergraduate scholarship aid. Our Alumni Admissions Program reached out across the country, making local contact with more than 1,200 prospective students.

Our Alumni Office staff is exceedingly talented and conscientious. Their contributions are immense and invaluable. As to our alumni volunteers, I am continually delighted and impressed by the quality and capabilities of the men and women who enthusiastically and effectively do the work of our Association.

You should know that the efforts and results of our programs have been widely heralded. The WPI Alumni Fund is one of only three in the nation to be recognized by the Council for the Advancement and Support of Education (CASE) and the U.S. Steel Foundation for four consecutive years of sustained excellence in college fund raising. Our alumni publications have been recognized nationally for excellence in design and presentation. Such widespread attention is important, to be sure, but our most gratifying recognition comes from WPI itself. From the top down, the college is strongly committed in its appreciation and support of the Alumni Association and our programs.

Happily, such commitment works both ways. As we work to benefit WPI, we gain a continuing sense of involvement with an institution of excellence, the pride that comes from accomplishing something worthwhile for our alma mater, and the pleasure of associating with the marvelous people found in the WPI community.

We as alumni are a key element of the excellence that is WPI. Just as WPI is a special institution, so our alumni body is truly a special breed, and we can be justifiably proud of our role in the growth and success of our alma mater.

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE

VOLUME 86, NUMBER 3 FEBRUARY 1983

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Kenneth McDonnell

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I **What We Talk About When We Talk About the Future**
Western culture sees the future in terms of change—but, says an anthropologist, that is an assumption, not a given.
Mark Mosko

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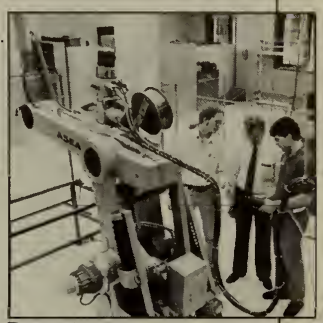

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Inside back cover

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Cover illustration by Allen Carroll.

NEWS FROM THE HILL

A Legacy of Excellence

Pictured above are students—a portion of the WPI Class of 1986—who gathered with their families for Freshman Orientation Day on August 28. Incidentally, each of these incoming students has one parent who is a WPI grad. Congratulations and best wishes to these present and future alumni and their families!

Besides the 12 freshmen pictured, another 14 sons and daughters of alumni entered WPI in September. And of the alumni below, one gets special mention: Helen G. Vassallo. With a 1981 MBA from WPI, Vassallo (who also has her MD) is now associate professor of management at WPI.

Parents with tradition. In the first row (left to right) are Peter H. Horstmann, '55, President of the WPI Alumni Association, Edwin B. Coghlin, Jr., '56, Patricia Coghlin, '86, Maureen Coghlin, WPI President Edmund T. Cranch, Paul Torcellini, '86, Dottie Torcellini, Henry Torcellini, '63, Robert Torcellini. Second row: Michael Vassallo, Jane Firla, William J. Firla, Jr., '60, Suzanne M. Firla, '86, Joseph A. Krans, '86, Jeannette Krans, William C. Krans, '64. Third row: Edwin D. Tenney, '59, William C. Hees, '59, William P. Hees, '86, Barbara Fay, Cheryl A. Fay, '86, James E. Fay, '61. Fourth row: Helen G. Vassallo, '81, Virginia R. Vassallo, '86, Charles Vassallo, Roberta Mellen, Teresa L. Mellen, '86, Lawrence E. Mellen, '59. Fifth row: Charles H. Goodpseed, '67, Stanley W. Graveline, '58, Stephen J. Graveline, '86, Nicki Graveline, Edward L. Ahlstrom, '50, Hilda Ahlstrom, Alan R. Ahlstrom, '86. Sixth row: Charles Goodspeed, Margo Goodspeed, Christine G. Goodspeed, '86, James W. Mahoney, '59, Irene Mahoney, David A. Mahoney, '86.

Scorecard: WPI Fall Sports Final Results

Varsity Football 5-3

WPI 44	Fairleigh Dickinson	0
WPI 59	Coast Guard	32
WPI 26	Colby	3
WPI 18	Lowell	0
WPI 21	Hofstra	35
WPI 13	Bates	21
WPI 3	RPI	7
WPI 27	Hamilton	12

Soccer 6-6-2

WPI 2	Bentley	0
WPI 0	Wesleyan	(OT) 0
WPI 1	MIT	(OT) 0
WPI 3	Coast Guard	5
WPI 1	Lowell	0
WPI 2	Trinity	1
WPI 3	Assumption	0
WPI 2	Holy Cross	(OT) 2
WPI 0	Nichols	2
WPI 1	Hartford	(OT) 2
WPI 1	Brandeis	4
WPI 3	Clark	1
WPI 1	Bowdoin	2
WPI 1	Babson	2

Women's Tennis 5-5

WPI 5	Emmanuel	0
WPI 4	Clark	3
WPI 5	Bryant	2
WPI 3	Assumption	4
WPI 2	Rhode Island College	5
WPI 2	Brandeis	5
WPI 6	New Hampshire College	1
WPI 3	Suffolk	4
WPI 1	Worcester State	6
WPI 3	MIT	2

Volleyball 9-20

WPI 1	U. Mass.	2
WPI 0	Worcester State	2
WPI 0	Tufts	2
WPI 2	Amherst	0
WPI 0	Merrimack	2
WPI 0	RIC	2
WPI 2	Brandeis	1
WPI 2	Western New England	0
WPI 1	Stonehill	2
WPI 0	Assumption	2
WPI 0	Wheaton	2
WPI 1	Coast Guard	2
WPI 0	Eastern Connecticut State	2
WPI 2	Amherst	0
WPI 2	Framingham	0
WPI 1	New Hampshire College	2
WPI 0	Williams	2
WPI 2	Bryn Mawr	1
WPI 0	Wellesley	2

Chris Clancy, right, '85 EEB, of Braintree, MA helped lead the Lady Engineers to a 14-6-1 season and the Massachusetts Class C Tournament championship.

WPI 0	Vermont	2
WPI 0	Union	2
WPI 0	Clark	2
WPI 0	Babson	2
WPI 0	Bryant	2
WPI 3	Fitchburg	1
WPI 1	Simmons	3
WPI 2	Regis	1
WPI 2	Bradford	0
WPI 0	Bentley	2
WPI 0	Holy Cross	2

Field Hockey 14-6-1

WPI 4	Anna Maria	1
WPI 3	Clark	0
WPI 3	Assumption	2
WPI 4	Framingham	0
WPI 2	Connecticut College	3
WPI 5	Franklin Pierce	2
WPI 0	Clark	0
WPI 2	Nichols	0
WPI 0	Tufts	1
WPI 1	Wheaton	0
WPI 1	MIT	0
WPI 3	WNE	1
WPI 0	New England College	0
WPI 2	Fitchburg	(OT) 1
WPI 4	Smith (State Class C Tournament Champion)	1
WPI 3	Worcester State	0
WPI 1	Amherst	(OT) 2
WPI 4	Norwich	2
WPI 0	Skidmore	0
WPI 1	Fitchburg	2
WPI 3	Cortland (EAIAW 1st Round)	4
WPI 4	Smith (EAIAW Consolation)	2

Cross Country 1-10

RPI	25
MIT	32
WPI	77
Lowell	21
WPI	36
Holy Cross	19
Assumption	56
WPI	71
Clark	114
Holy Cross	20
WPI	43
Coast Guard	19
Babson	54
WPI	55
Trinity	19
WPI	30
Tufts	24
WPI	35

Getting a Gripper on the Future

Robots are revolutionizing the plant floor, forcing industry to advance quickly on the robotics learning curve. WPI's response to this challenge starts with a no-nonsense corporate-academic bond.

By Kenneth McDonnell

When Isaac Asimov, author of more than 260 science-fiction books, recently addressed a spellbound WPI crowd on technology's role in history, he reminded us that it was he who coined the term *robotics*. To take such things a step further, the term *robot*, from the Czech *robota*, or serf, was popularized a half-century ago by the Czech playwright Karel Capek.

Today robot is a household term, and robotics is a concept ballyhooed in countless board rooms. But in the same way that the uninitiated may conceive of robots only in the likeness of *Star Wars*'s R2D2, executives bent on bringing to their assembly lines what they may consider to be state-of-the-art gadgetry may be astounded at the complexity of bringing to their plants true robotics—systems of computerized, reprogrammable machinery that can move parts or manipulate tools through pre-specified sequences.

The stakes involved in getting up to speed in today's robotics can be equally astounding. Time and again, robots have been shown to improve productivity, relieve workers of tedious, dangerous tasks, and contribute to the company's competitive health. But all for a price: starting at $30,000 and soaring into the millions for hardware alone, not to mention costs like installation, interfacing with existing machinery and maintenance.

Of robotics, says Professor Donald N. Zwiep, Head of Mechanical Engineering and Director of WPI's Manufacturing Engineering Applications Center (MEAC), "A revolution is occurring on the plant floor, requiring top-down commitment to rapid deployment of existing technology." The manufacturers first to gain a foothold in this emerging field, he contends, will get a head start in domestic, and possibly foreign, markets. It is widely acknowledged that the U.S. is hard pressed to compete successfully with Japan in sales of manufactured goods, in productivity, and in profits. In large part, say experts, this state of affairs is due to Japan's widespread application of robotic technologies—technologies available, and often developed, in the U.S. "Developing a corporate critical mass in robotics is essential to effective application of robotics," says Zwiep. That, and exposing students to real-world robotics problems, is MEAC's mission.

Enter Hartford-based Emhart Corporation, a $1.8-billion multinational giant engaged principally in metalworking manufacturing—shoe materials and machinery, glass container machinery, rubber, plastics and gear machinery, as well as hardware and chemicals production. Many of these are ideal for robotics applications.

Walter L. Abel, '39 ME, is Senior Fellow, Technology, at Emhart. Abel came to Emhart with United Shoe Machinery when Emhart acquired that firm in 1976. He brought with him ideas. He also brought the hard realization that the robotics revolution would surely leave the mighty Emhart foundering in the wake if the conglomerate didn't act quickly and decisively.

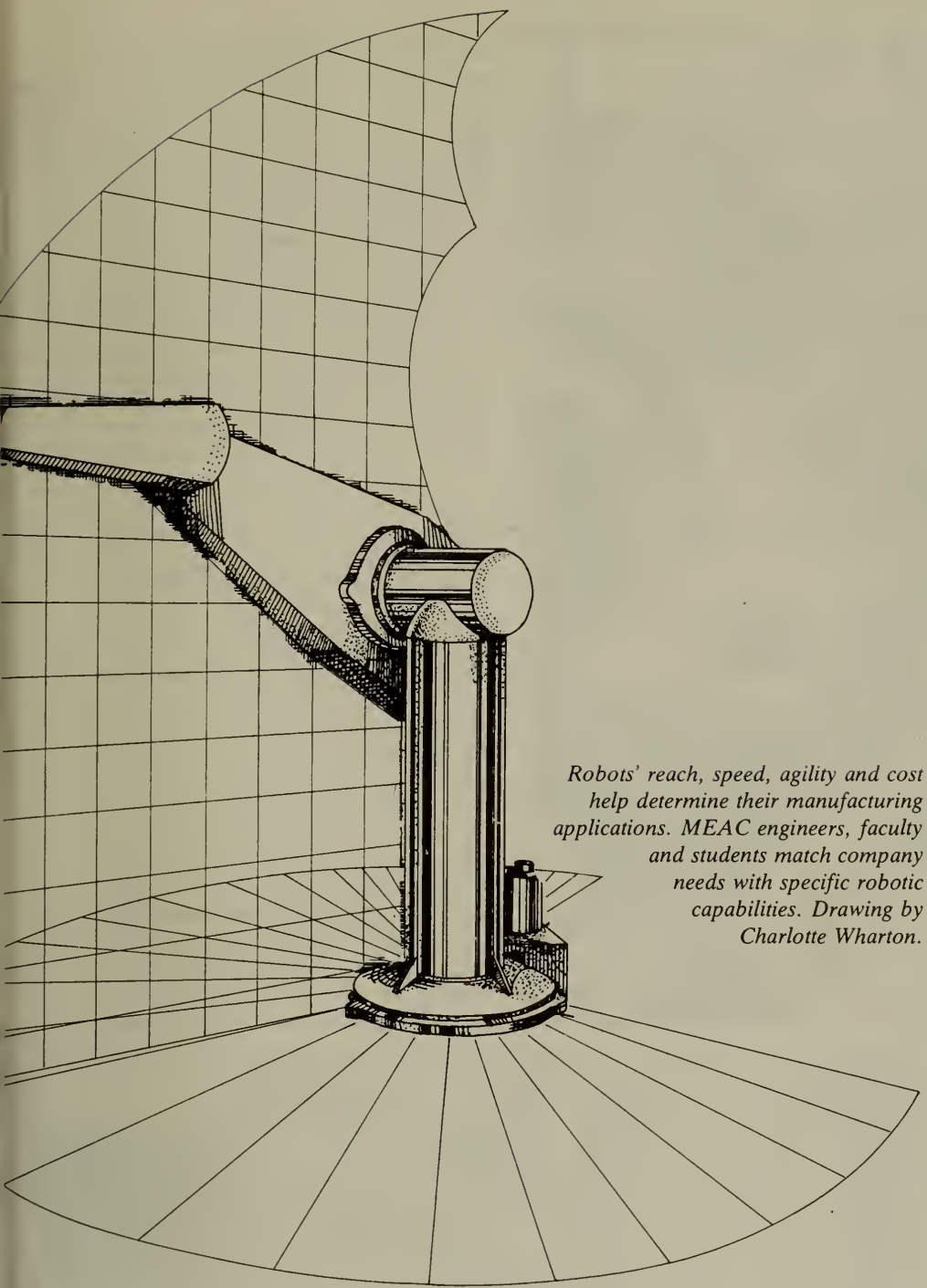
"We built a robot back then," Abel recalled recently, "but that was before microcomputers came along and enabled greatly expanded memories and flexibility in robots." Leave robot building to the robot builders, he decided—Unimation, Cincinnati Milacron, GE, ASEA, and so on.

Concentrating on *applying* existing robotic technology, Abel realized, made more sense. But a major obstacle remained, of course: finding and tapping the resources capable of actually bringing these advanced technologies onto the plant floor—"a tricky problem all users are going to experience," he contends. He approached several colleges with the idea of an applications center before it became clear to him that WPI possessed the unique balance of needed resources.

Abel sits on the Board of WPI's Management Department. "Literally over a cup of coffee, as is often the case," says Arthur Gerstenfeld, Department Head and MEAC founder, "we realized that by bringing Emhart engineers and state-of-the-art robots into the neutral college environment and conducting student projects, faculty research and cooperative WPI-Emhart exercises, we could achieve several joint objectives.

"We wanted to help Emhart get its robotics program up and going, establish a growing body of robotics expertise at WPI, and prepare future engineers for the booming growth expected in robotics." In reaching these goals, he says, MEAC has managed to avoid the classical industry-academic relationship, where industry provides monies to the college, to be applied toward some study resulting in a report seldom read. "No, we wanted—and have achieved—a true partnership, where each side gives and gains."

In March 1981, MEAC became a reality, when Emhart robots were wheeled into WPI's Washburn Shops. Now, located in an expanded Higgins Labs setting, pending Washburn renovations, the Center provides just the kinds of resources envisioned in those earlier Board coffee breaks. "Industry needs applications quickly," says Abel, "but not by sacrificing security." Students are risk-takers, he believes, forever coming up with new ideas. "MEAC enables us to road



Robots' reach, speed, agility and cost help determine their manufacturing applications. MEAC engineers, faculty and students match company needs with specific robotic capabilities. Drawing by Charlotte Wharton.

test these and our own ideas *before* they reach the production line, thus ensuring that the bugs are out before the chips are down."

Several projects have been completed; others are under way or planned. The first was an ideal robotic application: endurance testing of pop rivet guns. Normally a human task, it is a monotonous and mentally fatiguing proposition, requiring up to a million manual loadings, firings, and ejections of spent rivets. Working closely, WPI faculty, students and technical advisors combined expertise with Emhart engineers to define the problem at hand, and then to develop an automatic rivet feeder system, a loading and firing mechanism (employing a Unimate 600 robot) and a counter, as well as a monitor to record precisely what takes place (something humans do not perform so carefully).

A second project used a Unimate robot to automatically combine two press operations in the production of doorknobs. Fetching rough parts, feeding them into a drawing and then a trim press, as well as simultaneously lubricating the parts, were the Unimate's appointed tasks. Delivery of both the tool-tester and the doorknob systems was achieved four months ahead of schedule. Needless to say, this experience has left Emhart, WPI and many in the industrial world very pleased.

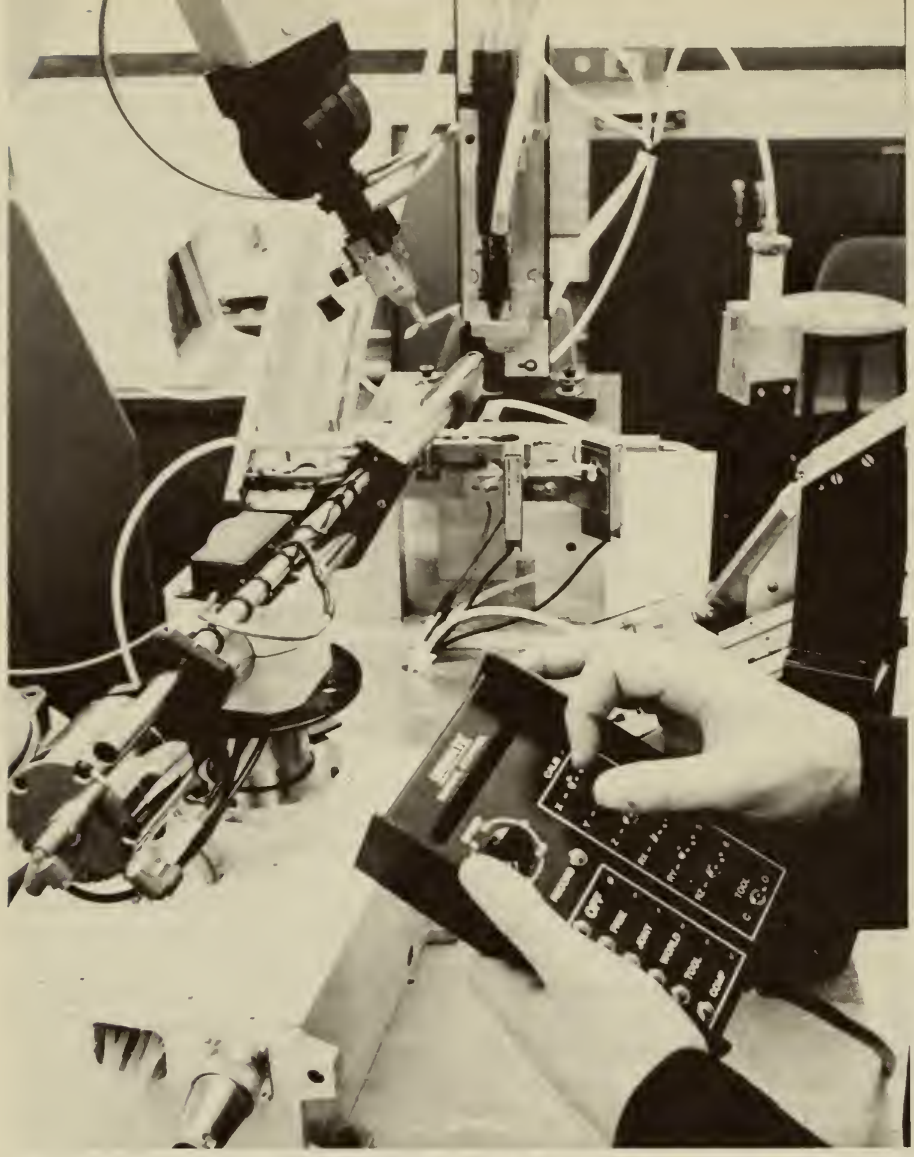
Once WPI and Emhart had decided that such a close academic-corporate interchange was possible, a third project was undertaken. This project addressed robotized lock assembly, encompassing machine loading and materials handling, a ubiquitous activity in industry today, but one that can often benefit greatly from the use of robotics. Here, not one but two robots were programmed—to work as a team. "The beauty of this project," says Gerstenfeld, "was that the actions of one robot instructed those of another. We were moving away from islands of robots working independently toward networks of automation—to true robotics," where, he says, the output of one robot becomes the input of another, all monitored by a common host computer.

Currently, Professor Robert L. Norton (ME) supervises some 25 students engaged in qualifying projects focusing on several aspects of Emhart's operation. "They call themselves the 'shoe-shankers' and the 'lock-polishers,' " he says. They work in what he terms competitive teams, with each team approaching the same problem from a different viewpoint.

The shoe-shankers, he explains, are applying existing robotics to the task of wrapping shoe shanks, thin metal plates that stiffen the shoe with tape before they are inserted between layers of sole leather. Correct taping is crucial, he says. "Next time your shoes creak and squeak as you walk," he adds wryly, "you'll know that someone got careless on the shoe shank line." And no wonder, considering how boring the taping job can be for the worker.

Each student team is examining, much as a consulting engineer would do, the feasibility of robotizing the taping process: The teams visit the USM plant, identify the problem, and conduct extensive background research—including an overview of the shoe shank industry, Emhart's place in that business, shoe manufacturers' needs, and robots available for the task. Finally, each team specifies the tasks necessary to solve the problem.

Similarly, the lock-polishers investigate how robots can provide more consistent, economical results in a traditionally labor-intensive, physically demanding task. Both projects will include post-implementation analysis of the robots' effectiveness, and revision and improvement of the systems.



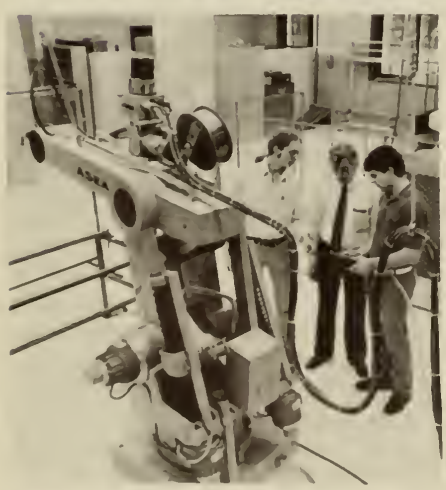
William Denison

Says Norton, "Emhart's receptiveness to these projects has been fantastic."

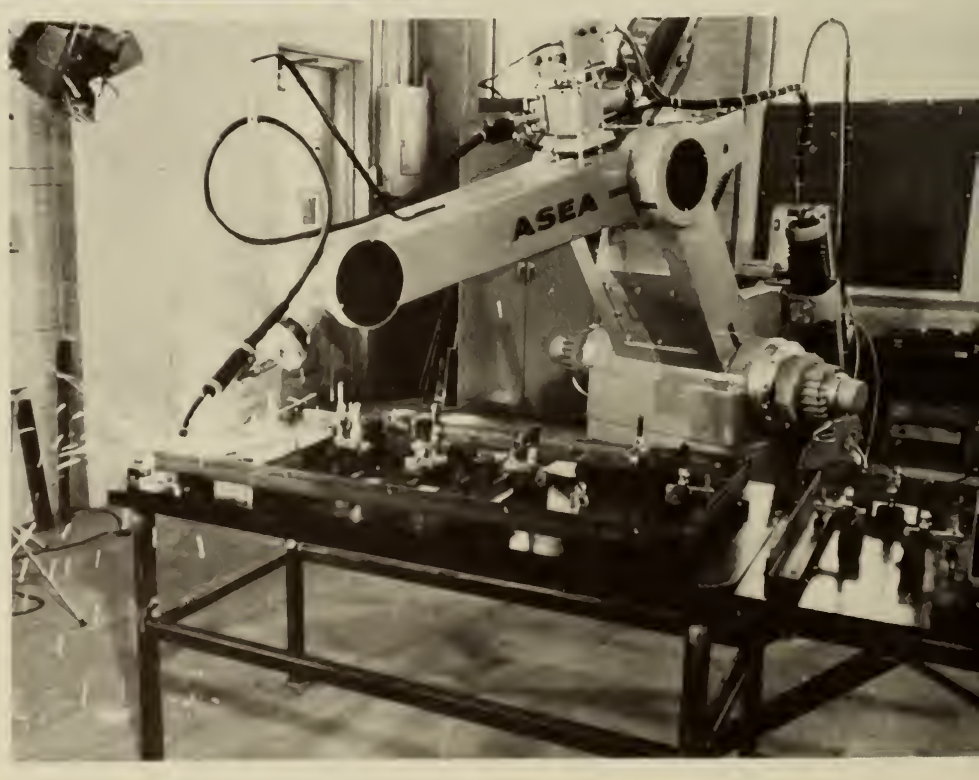
Last year," according to Professor Ben Gordon, '65 ME, former Technical Director of MEAC, "WPI graduated 18 mechanical engineering students with robotics experience." With computer-aided design and manufacturing (CAD/CAM) now the hot item in industry, he believes recruiters coming to campus will be more and more interested in seniors with hands-on experience in these exciting new fields. Future MEAC projects will focus on integrating CAD and CAM, interfacing with WPI's CAD lab, and thus minimizing the need for human intervention in the design-manufacturing process. (See "The CAD/CAM Connection," WPI *Journal*, August 1982.)

Yet the kinds of projects completed and envisioned for MEAC cut across several disciplines, according to Morton Fine, '37 CE, MEAC's Program Administrator. They encompass electrical engineering, computer science, social sciences, and other fields.

Currently, robotics installations in the U.S. number only about 5,000, while Japan boasts three times this figure. But sales are taking off, say industry experts, reflecting shifts in consumer preferences and growing demand for customized products. Because of this need for greater product variety and quality, financial analysts expect sales to soar from $100 million in 1980 to $2 billion by decade's end.



Marek Nowak



Robots at work. Top: Seico and Unimate robots cooperate on a delicate lock assembly operation. Right: MEAC's ASEA robot. Above: Flanked by Bruce Daube (L), '83 ME, of Simsbury, CT, and John Moore, '83 ME, of Portland, ME, Professor or Robert L. Norton (ME) instructs an ASEA rigged and programmed for welding.

And if IBM plunges into the field, say most, the market could balloon even more.

"At Emhart," says Wally Abel, "we're gearing up now for the competitive battles we see looming on the horizon as a result of available and rapidly developing robotics technologies." MEAC, he believes, has provided the competitive edge Emhart naturally seeks.

"The beauty of MEAC," says Technical Director David Asmus, "is that it's not just a think tank. Applications are what industry needs, and adapting state-of-the-art technologies to unique situations—often requiring wholesale conversion of stock robots—is MEAC's value to industry and education."

Though MEAC presently brings to campus only Emhart projects and the robots owned or leased by the company, WPI is committed to welcoming additional corporations into this uncommon partnership. "When it comes to robotics, companies are talking to each other," Director Zwiep says, "naturally not about product, but certainly about process." Japan's perceived lead in manufacturing, he says, has broken through many a barrier between U.S. firms competing with the Japanese and other Asian and European nations in tight markets.

Together with MEAC's sister program, the Center for Management of Advanced Automation Technology (MAAT), fledgling robotics users can now develop more prudent approaches to *applying* and *managing* existing automated technologies. In the future, MEAC will also invite companies to attend short courses, briefing sessions, and tours, enabling a modest investment to result in real benefits without total commitment of the firm.

According to Dean of Faculty Ray E. Bolz, accommodating MEAC's anticipated growth will call for the college to acquire several of its own robots for educational and corporate projects, to complement those brought in by MEAC participating companies. "By next summer," he says, "we plan to have several more firms and robots on board."

The Eyes Have It

An increasing variety of automated tasks, from welding and grinding irregular surfaces, to inspecting parts and monitoring empirical research, to controlling video-guided missiles and forecasting the weather, call for continual adjustment of the machinery as the task proceeds. Normally easy for humans, sensing and responding to ever-changing stimuli are exceedingly difficult for robots and other automated equipment. And not surprisingly, developing even rudimentary vision to assist automation, for example, in orienting work pieces or identifying damaged parts, looms as one of the stickiest challenges facing researchers.

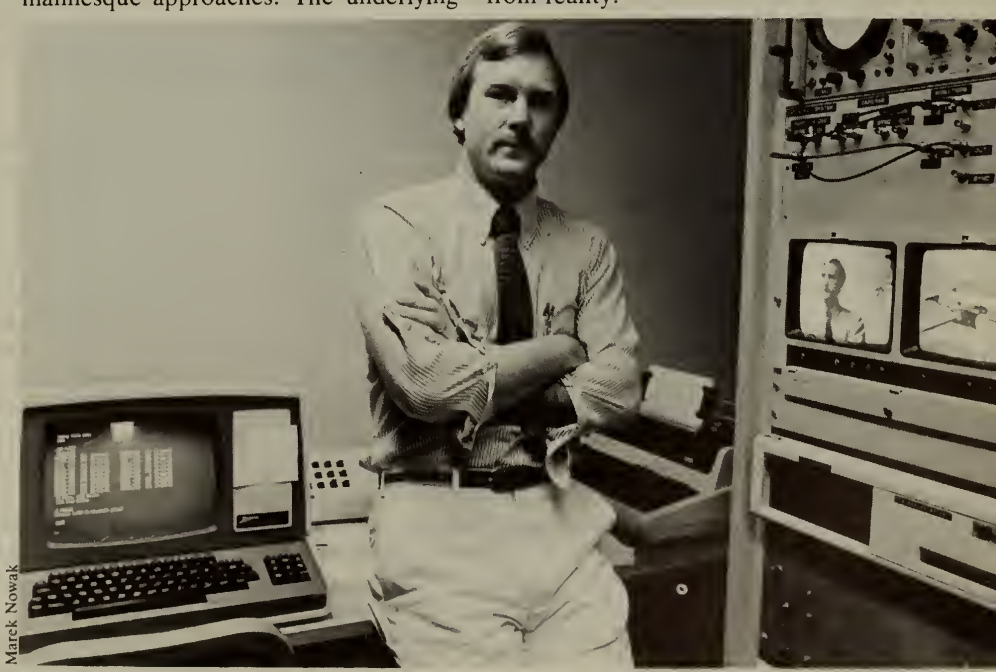
"Image processing, or computerized vision," says Professor Robert J. Schalkoff, EE, "is an area of artificial intelligence which, when fully developed, will imbue automation with a large dose of 'blue-collar' humanness. The difficulty in simulating vision through known means helps us appreciate just how marvelous and often taken for granted our sense of sight is."

Schalkoff leads a small but active group of faculty and student researchers looking at alternative ways of coupling cameras and computers. The hard part, he believes, is not in enabling robots to see, but in getting them to reason visually, to "think," if you will.

Today's most advanced robots, for example, use any of several vision systems, such as digital comparison of computer-converted camera images with templates stored in the computer's memory. When the computer "discovers" a similar set of information—such as the area, perimeter, and diameter of an object—it "recognizes" instantly what it is looking at, but only if object and template match closely enough. Other methods are available, but the results are similar: To be commercially feasible and as effective as human sight—perceiving depth, seeing in stereo, or merely distinguishing objects—current vision systems would have to be a million times faster and far more adaptable.

The research of Schalkoff and others in EE, including Professors John A. Orr and David Cyganski, indicates that a major roadblock to effective image processing is insufficient—or inappropriate—computer power. What's needed, he believes, is a completely new computer architecture, divorced from today's von Neumannesque approaches. The underlying structure of the computer, he says, should reflect the type of data being examined. "Since vision consists of simultaneously interpreting many non-numeric symbols, which are not easily quantifiable, it seems only logical that the 'thinking' of computers should reflect this task as closely as possible." In Atwater Kent's sparkling new labs, faculty and student research is focusing on this challenging endeavor.

Some experts see the day when robots will be driving cars far more safely than their creators possibly could. As back-seat drivers, we will watch our steely-eyed chauffeurs negotiate oncoming curves, signals, and traffic with unerring precision. But in the eyes of Bob Schalkoff, at least, this scenario is a long, *long* way from reality.



Marek Nowak

Professor Robert J. Schalkoff teaches machines to see.

Foreign Exchange:

Global Engineers and Scientists in the Making

This year marks the beginning of the second decade of WPI's Student Exchange Program with foreign technical universities. Since 1972, some 150 British and American students have participated in academic exchanges with our chief partner—The City University in London's historic district near St. Paul's Cathedral and the Tower. In addition, other WPI students have spent semesters at Trent Polytechnic in Nottingham, England; the Federal Technical University (where Albert Einstein studied) in Zurich, Switzerland; and, most recently, with the Royal Institute of Technology in Stockholm, Sweden. A new program in Munich, Germany, is in late stages of development. In fact, WPI now offers more opportunities to study in more locations abroad than any other U.S. college of engineering and science.

Unlike many other exchange programs, WPI's program places third- and fourth-year students directly in British, Swiss, or Swedish classes at the foreign university. Our students usually live in dormitories with a cosmopolitan mixture of native-speaking and other foreign students. To ensure that their academic programs proceed in proper fashion, most WPI students concentrate on research for IQPs which contrast American and foreign practices for applying technology to social needs and concerns. Many students also work on humanities Sufficiencies by studying European art, history or literature, or (for Sweden and Switzerland) foreign languages and cultures. And despite costs and time demands, almost everyone makes good use of travel opportunities in Europe.

Participating in a foreign exchange may become increasingly vital to the education of WPI students, for it can contribute in real terms to successful careers in engineering, science and management. Day by day, news stories remind us of how international in scope science, technology and business have become.

One recent alumnus of the London program stopped by WPI not long ago, on his way to a new assignment in Saudi Arabia. The exchange, he explained, had whetted his appetite for working overseas.

Recently, about 25 participants in WPI's exchange program gathered for an informal discussion. There were U.S. students preparing for or recently back from Europe, British students studying stateside, faculty from WPI and abroad. The purpose of this forum was to share experiences, perceptions and expectations about the Exchange and student life abroad, and to compare notes on British and U.S. education. What follows are excerpts from that lively session where, for one thing, we learned that academics is only part of the Exchange experience.

Professor Lance Schachterle (HU)
Student Exchange Program Coordinator

Question: What do students gain from being part of the Exchange?

Christopher Heyl, '84, ME *(Planning to study at City University, Spring 1983):* It's a great opportunity to get to Europe and study in a different environment—and a great chance to see Europe for a reasonable price.

Keith Agar, '83, EE *(Spent Fall 1981 at City):* City's strong emphasis is in engineering. But the manner in which the courses are taught is totally different from the American system of education. The Exchange is valuable in enabling you to see how other people learn. And the project opportunities are diverse in Europe.

Roger Weber, '84, CE *(To City, Spring 1982):* City is really different. You take seven courses, and each course meets once a week. The course work varies from course to course, of course [laughter]. During the first half of the year we take it easy, but then we start working harder and harder. Finally, in the last three weeks, we really go nuts!

Mark Palmer, '84, CS *(Trent Polytechnic, now at WPI):* Back home we cram for exams at the end of the year. It seems that in the U.S. you cram every couple of weeks for exams. At Trent you tend to build up a large body of knowledge over the course of a year.

David Holden, '82, CS *(Trent, now at WPI):* I'd like to add something. I had the opportunity of working here in the co-op system, and that was a very valuable experience for me.

Gwyn Crouch, '85, MA *(To Trent, Winter 1983):* On a more personal level, is European teaching more, or less, personalized than in the States?

Kirsteen ("Kiki") Hodgson, '83, MG *(City, now at WPI):* At City University at least, you find that you're not allowed to ask questions in lecture, because the classes tend to be much larger, and the professor doesn't want his lecture schedule delayed by questions. Questions and discussions must wait until free time.

John Mansour, '83, PH *(To City, Fall 1981):* I found that some of the courses we took didn't have many students and weren't as impersonal. Classes were more formal than I was used to, but not to the point where you couldn't ask questions in lecture.

Keith Pugh, '84, CS *(City, now at WPI):* At Trent it's fairly informal. The classes are small, and you can approach the professors.

Keith Agar: City doesn't seem to offer such an integrated system of teaching as U.S. schools. If you're a civil engineer, British schools have a program designed for you. In electrical engineering, you have a different program of studies. Within each department, they teach you all the necessary outside

David Holden

"The Exchange gives you a whole new perspective on education and people."

Chris Heyl, Gwyn Crouch, Paul Williams

courses, like mathematics and chemistry, but it's all within one department. It is such a difference in teaching techniques that you can't really count on the courses you take over there to back up the courses that you have here. You get a new and different perspective on how to learn once you're over there.

John Mansour: At City there are no formal textbooks and everything's taught verbatim from the notes the professor has set up for his lecture. Here, I'd be lost without a textbook for all of my courses, but over there the professor suggests books for the course.

Professor Keith Jacques *(University of Stirling, Scotland):* You've pretty much covered the whole spectrum of possibilities in all British universities. Each method is committed to solving problems in one form or another. The modern subjects—like management, for example—tend to be less formal than the traditional subjects. But it does depend on the institution.

Robert Catino, '83, CS *(To City, Spring 1982):* From what I've seen in my IQP on comparative engineering education [see box, p. 11], the British student's work is based pretty much upon formal examination, whereas in America it's more of a continuous assessment.

Kiki Hodgson: That depends on the department. In my department—management—course work throughout the year counts 40 percent of the final grade. So the exams count only 60 percent.

Bob Catino: In England there's a much narrower scope of educational institutions, because there exists a different system of accreditation. Here we have the American Board for Engineering Technology [ABET], which accredits each department at each institution. The U.K. has what's called an external-examiner system, where professors from different institutions assess each other's programs. In that way they try to ensure that the education offered at one institution is nearly equal to that of every other institution.

Professor Jacques: I would agree with that.

Question: Let's talk about your project experiences.

Chris Heyl: I'm going to City University next spring to complete my WPI Sufficiency requirement on the origins of the Royal Society.

Gwyn Crouch: I'm going to Trent next spring to do a Sufficiency in drama. I'll be researching realism and the contemporary end of the drama in England and comparing it to that of America.

Paul Williams, '84, EE *(To Trent, Spring 1983):* I'll be doing an IQP on the economics of the branch lines of British railways, not the glamorous ones, but the not-so-glamorous ones, which some people want to get rid of and some people want to keep. It's very controversial. It's part of what a lot of people at WPI are studying for their IQPs.

Frank Dunn, '83, EE *(To City, Fall 1982):* I did an IQP on the electrication of the British rail system. The Railroads Group, as we're called, studies different countries' rail systems. Some do the U.S. railroads, some the British, some the Swiss. All the reports are compiled, so you can compare nations. With this as background, exchange students know where to start, and you can get to the important sources of information quickly.

Roger Weber: I compared English and American building design with respect to energy efficiency.

John Matthews, '84, EE *(To City, Spring 1983):* My IQP will be a comparative study of the Reagan and Thatcher economic policies and how they affect technological innovation of affected countries.

Kevin Cavanaugh, '83, EE *(To City, Spring 1982):* I did my IQP on the British telecommunications industry. I met many of the people in City's EE Department as well as people in industry and the Departments of Industry and of Trade. I spent an hour or two with these people, took tea with them, and had quite an enjoyable time.

Keith Agar: Right. Just being a foreign student helps immensely in getting in touch with people who are more than willing to talk to you.

Question: Kiki, why did you come to WPI as a Management major?

Kiki Hodgson: The management courses I take at WPI are very different from those I take back home. But mostly I'm attracted by the cultural experience of the Exchange. Everybody's talking about academics, but I think the cultural aspect is probably the major thing that attracts many students.

John Mansour: Keith [Agar] and I arrived in England a few weeks before classes started. We spent a week in London. There were lots of students there from all over the world. Then we went to Scotland for a week, staying in hostels and "bed-and-breakfasts."

Matthew Turner, '83, EE *(To Trent, Spring 1982):* I lived with an elderly couple a few miles from Nottingham. Living off-campus tends to increase the cost of the Exchange, because you have to use public transportation every day, but if I had to do it over again, I'd do it the same way. You get to see the British way of life a lot more closely when you're actually living within it. After all, that's what you're going over for, to see what England's like.

Dave Holden: I'm enjoying the opportunity of living in a fraternity at WPI. It's a very interesting experience. I had no idea what fraternities were like before I came to the States.

Eileen Kelleher, '84, CE *(To Stockholm, Summer 1982):*

"The cultural element of the Exchange attracts students as much as the academics."

Kevin Cavanaugh

London's Northampton Square in springtime

Even though most people speak English in Stockholm, if I had stayed with a family I would have learned a lot more Swedish and a lot more about the Swedish culture.

Question: What is student life like in Europe? Social and campus activities, clubs, things like that.

Mark Graves, CS *(Trent, now at WPI):* The social life in Britain is a lot quieter than in the U.S., from what I've seen.

Keith Agar: I thought it was just the reverse at City University. There are quite a variety of activities that always seemed to be going on. Some of the fraternity parties were more classy than typical parties here.

Professor Sam Woolford *(Mathematics, on faculty exchange last year at Trent):* In England the social life centers about the pub, which is a completely different type of social atmosphere than you'll find here. I think it works out to be about the same as our social system, except maybe it's less formal than our fraternity or organized parties. The pub is one of the prime places where you'll meet English people, where you'll see the English social system in practice. I think some of the attitudes and things you'll learn there are very pleasant, very nice.

Professor Jacques: I presume people have just about enough pocket money to buy other things besides beer, especially if you're in a place like London. There's an enormous amount to do in London, but spend a few weekends in other parts of the country, because London is not fully representative of Great Britain at all.

Kiki Hodgson: As any great city does, London offers a great many facilities—theaters, cinemas, nightclubs and museums. And I think sports are taken much more seriously here than at City.

Bob Catino: I'd like to add a word about travel. Traveling in England—and elsewhere in Europe—is ridiculously easy—when the trains are running. It's great to simply get on a train and say, "That looks like a nice place," and go there. If you have a British Rail pass, you can just get on and get off anywhere and walk around the town and find a bed-and-breakfast or a hostel.

Kiki Hodgson: True, and a Eurail Pass or Interail Pass is a very good and inexpensive idea for European travel.

Mark Graves: Americans seem a lot more open and a lot more friendly than the British. But when you go to England, don't feel we're unfriendly, we're just rather introverted. English people seem really quiet to start with, but they're pretty friendly underneath.

Professor Jacques: I think that applies even more when you get out into the provinces.

Professor Woolford: It's probably the same anywhere in the world that you go. You will be received in England in probably the same way that British students feel that they have been received here.

John Mansour: That's really true. The British are very helpful and very friendly.

Professor Willy Eggimann *(EE, Coordinator of the Swiss Exchange):* One of the advantages of the Swiss and Swedish exchanges and of the German Exchange, which we plan to organize soon, is that you have to learn a foreign language. We handled it fairly well with the Swiss Exchange, and the German exchange will be even easier because we have a very good German language program at WPI. But there's no opportunity to learn Swedish in Worcester. So I offer a Swedish course on cassette tapes. This should be sufficient to familiarize you with the language.

Question: What words of advice can any of you offer students preparing for or interested in the Exchange?

Keith Agar: Living in the City University subsidized housing helps tremendously, because London is so expensive. I'm not sure of the exact figures, but it didn't break me. Summer jobs help a lot. As far as suggestions for students going over, I think it's critical that you get knowledge about the Exchange Program at least by the end of your freshman year. You should plan your schedule very carefully for the next three years, because you want to make sure that you're not missing anything essential for graduation.

Bob Catino: Just be open-minded. Go abroad to get the project work done, but to have a good time as well. Don't forget the Continent is only 26 miles away.

Professor Bruce McQuarrie *(Mathematics, Coordinator of the Trent Exchange):* Be flexible when you go. If there's one thing you can count on, it's that things will be different. They won't be better, they won't be worse. They will simply be different.

Keith Agar: That's good advice. It might be naïve, but before I went to England, I thought everyone did things the way Americans do. But when I got to London, I found that not to be true. That eye-opening experience is valuable.

Eileen Kelleher: I have a question concerning being a female and traveling, finding bed-and-breakfasts, and so on.

Kiki Hodgson: A young American woman, who was my next-door neighbor at City University for a semester, traveled alone for a month in the U.K. I don't think I'd do that myself. But traveling with one or two people is a good alternative.

John Mansour: One thing I learned was that, unlike traveling, for example, to Canada, when you move between European countries, within a few miles you're in another world almost, a different culture, needing a different language. To people here, the United States is the world. I think once

Keith Pugh

"Count on this: things will be different abroad. Not better or worse. Simply different."

Eileen Kelleher

Professor Sam Woolford

you're over there you're going to see that there is a whole other part of the world. I think that's probably the best part of the program. You become very aware that there are other countries, other views, other peoples.

Keith Agar: Just being in different countries gives you a lot more confidence in yourself and your abilities to deal with new and unfamiliar situations. When you're traveling in France, for example, you may not know much French, but you manage to find someplace to eat, to deal with unfamiliar currency, to get a hotel room for the night.

Matt Turner: Probably the most rewarding things for me were non-academic related. I definitely encourage people going on the Exchange to get involved in the English lifestyle and go to sporting events and the theater and don't just worry about academics because there's a lot more to it than that.

John Mansour: There were good and bad experiences, but all in all, it was well worth it. One of the first things you do is find a map of London and mark off where the McDonald's restaurants are.

Keith Agar: Just one last piece of advice: Don't let your classwork interfere with your education.

At Home and Abroad

In the United Kingdom, an engineer can be anyone from a bus driver to an appliance repairperson to a college-educated professional. According to WPI seniors Malcolm Berke (MGC) of Livingston, NJ, and Robert Catino (CS) of Rocky Hill, CT, this situation is a fascinating and somewhat troubling commentary on engineering education in Britain and the status of her professional engineers. But, they say, Britain's centuries-old educational methods seem to enjoy several advantages over the U.S. system.

Roommates at WPI, Berke and Catino spent part of their junior year based at London's City University, systematically comparing undergraduate engineering education in the U.K. and the U.S. Now in its final stages, their IQP gets to the heart of some controversial issues and spells out how faculty, students and administrators in both countries rate their own institutions.

In January 1980, a British report called *Engineering Our Future,* also known as the Finniston Report, concluded that the quality of the British engineering system is a key factor in that country's current industrial woes. According to the report, British professional engineers are used ineffectively, their status, compared to that of their U.S. counterparts, is depressed, and, because British engineers are unprotected by licensing or registration practices, there are no universal British employment policies or salary, training, or academic requirements.

The picture painted by the Finniston Report of British engineering is far from rosy. But is it a valid portrayal? And how does the U.S. stack up?

These are the questions Berke and Catino set out to answer. Through questionnaires and interviews with students, faculty and administrators of selected British and U.S. technological colleges, they sought to separate myth and fact.

Bob Cantino and Malcome Berke compared U.S. and British engineering education.

"By and large," reports Catino, "our study reflects the findings of the Finniston Report." To illustrate the dilemma facing the engineering profession across the U.K., he recalls the reply of a British laundromat owner, when Catino informed the man of a jammed clothes washer. "The engineer," said the man, "will be up presently to fix it."

Fortunately, says Berke, the British government has commissioned a body committed to reversing this image. The mission of the Engineering Council is to develop guidelines for ensuring consistent programs in engineering education, clarifying in the public's eye the level of professional engineers' expertise, and encouraging the testimony of engineers in litigation calling for the opinions of experts.

But, he adds, while the British system may have its share of problems, its engineering cooperative program appears to be much stronger in practice than that of the U.S., due in large part to nearly full tuition subsidies by the British government. Plus, traditional U.S. higher education emphasizes periodic examinations, while the U.K. employs one- or two-year comprehensive exams. "At WPI," says Berke, "the Plan's two qualifying projects and the competency exam combine the best of both worlds."

PROJECTS

Foreign Countries And the EMP Threat

Interactive Qualifying Project (IQP)
Frederick Gummow, '84, EE
Patricia Martone, '84, EE
Patricia Porcaro, '84, CE
Dean William Grogan, '46, and
Prof. Joseph Soetens, Management,
Advisors

If a thermonuclear device is exploded at a high altitude, a powerful electromagnetic pulse (EMP), or "burst," is propagated. People would not die from the explosion, nor buildings be destroyed. But, according to an IQP compiled by WPI juniors Frederick Gummow of West Bridgewater, MA, Patricia Martone of Mechanicville, NY, and Patricia Porcaro of Boylston, MA, the electronic destruction caused by an EMP could instantly produce chaos throughout any nation.

"Virtually all exposed communications and computer systems could be wiped out by an EMP," Gummow reports. "Without protection there would be few functioning telephones, radios, power systems or computers."

Dean William Grogan, project advisor, adds, "Unlike the old vacuum tube circuits, the high-density electronic 'chips' on which our electronic American society now depends could be seriously affected."

Although lagging behind the U.S. in the application of the vulnerable microchip components, foreign countries seem very concerned about EMPs. In this project, sponsored by the National Research Council at WPI's Washington, DC, Project Center, students examined unclassified literature on EMPs developed by nine foreign countries. Not only did they read and abstract 75 documents, they also personally contacted 32 international experts in the field. They studied and analyzed EMP information published in Canada, Europe, and the U.S.S.R.

The group concluded that public awareness of EMP risks is highest in Switzerland, Norway and Sweden and that these countries and West Germany have taken significant steps to protect their electronics and to educate personnel for emergency situations. According to the IQP final report, unclassified literature indicates that several countries are worried that the U.S. is not yet capable of withstanding an EMP situation. From Switzerland comes the article, "The Bomb That Could Leave America Power Less;" from Britain, "[U.S.] Communications Clobbered;" and from Norway the warning, "If the Soviet Union exploded a nuclear bomb above the atmosphere in North America and West Europe, all the NATO countries would be helpless."

The importance of the WPI research is confirmed by a recent statement by Edward Teller of the Hoover Institution (IEEE *Spectrum,* October 1982, pg. 65): "Without widespread dissemination of [declassified] information to industry, . . . the civilian economy faces the prospect of grinding to a halt in a nuclear encounter."

Safer Knots for Surgical Sutures

Major Qualifying Project (MQP)
Donald R. Soubie, '82, ME
Michael R. Williams, '83, ME
Prof. Allen H. Hoffman, ME, Advisor

A postoperative patient may occasionally complain, "I think I've slipped a stitch." But because of the extensive testing given surgical knots by Donald Soubie, of Fitchburg, MA, and Michael Williams, of East Templeton, MA, in their recently completed MQP, such patient complaints may become even more of a rarity in the future.

The project, which was carried out with the cooperation of Dr. John Herrmann of the Department of Surgery at Worcester's University of Massachusetts Medical Center, investigated the mechanics of knot security in surgical sutures. Knot slippage was examined using large-diameter rope as a model. Visual observations and force measurements were also made, according to methods formulated by the American Society for Testing and Materials.

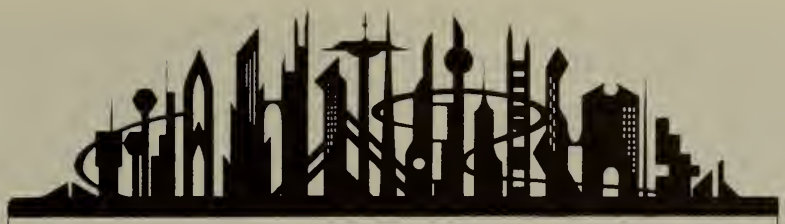
Because the knot used by the surgeon plays such an important role in keeping the surgical suture from slipping, the three most common knots (square, surgeon's and granny) were tested thoroughly. After being tied and placed in a tensile test machine, the knots were pulled until they slipped or tightened. Through the use of a videotape recorder, Soubie and Williams discovered that, as the knots were being pulled, they turned, became smaller and changed from their original shape. In the final analysis, the square knot was found to be most secure, with the surgeon's knot second. The granny knot was least secure.

They also found that the square knot attempted to align itself to become a two-force member. The surgeon's knot completely changed its shape and became smaller, but not as small as the square knot. On the other hand, the granny knot changed shape only slightly, by twisting and rotating, and did not become smaller. More than the square knot and the surgeon's knot, the granny knot tended to retain its original shape and size during the pulling.

In a rigorous knot slippage test, the granny knot failed 100 percent of the time. The surgeon's knot failed 80 percent of the time, with the square knot having a 0 percent failure rate.

It was also discovered that a knot formed from a multifilament suture material is more secure than the same knot formed in a monofilament material—the former tends to have a higher coefficient of friction and a lower flexural rigidity.

The findings of Soubie and Williams indicate that square knots in multifilament materials could be just what the doctor orders for your next operation. You might mention this to your surgeon just before you go under.



Somewhere between a gleaming Tomorrowland and a red-hot cinder lies the likely future of the globe. Join us to ponder it—spot a few problems, eye a few technologies, and eavesdrop on a convention full of futurists.

CULTURE & CLAIRVOYANCE

Is it possible to know the future? Or is the "future" a window on the past and present?

By Mark Mosko

What will happen tomorrow? Next year? Next century? Will there be peace? Is there an afterlife? To most people, such are the interesting questions about the future, questions concerned with prediction.

Anthropologists, however, tend to shy away from speculating about the future, because the study of many cultures reveals subtle complexities. What is meant by "future"? The future according to whom? You or me? This culture or another culture?

Anthropologically speaking, the interesting aspect of any prediction is not what it says about the future—which may or may not turn out to be accurate—but rather what it reveals of general assumptions about time and reality current *in the culture of the present.* Culturally shared notions about time and reality vary considerably within and between cultures, and the kinds of futures that each foretells will vary accordingly.

For instance, most of us have probably observed that the specific visions a person has of heaven or paradise reflect aspects of his life which he regards as vital in the here and now. The tired may think paradise will be eternal rest, while the Angeleno will think it is Southern California. (So may the Minnesotan.) Within a culture, similarly, specific ideas of the future express that culture's most basic beliefs and values. From this perspective, "the future" can serve as a code to the present.

In our Western culture, we tend to think of the future as an extension of the directional, linear, non-repetitive unfolding of time. There was the past, we live now in the present, and when the future does come it will consist largely of novel occurrences—new inventions, new societies, new institutions. Time in general moves on for us, never repeating itself, so that we see the future as marked by never-ending change. Hence the difficulties we perceive in offering reliable predictions about the future. In this view of time, no one can ever be certain which changes will indeed eventuate.

But in other areas of our culture and in some non-Western cultures, time is very differently conceived, such that the future is much less problematic. In Hindu culture, to take a well-known example, the entire universe undergoes never-ending cycles of creation and destruction. Each cycle of Hindu cosmic time lasts billions of years. Time is here cyclical rather than linear, repetitive rather than non-repetitive. At a smaller scale, in Hindu culture, living creatures (including humans) are bound to cycles of life/death/rebirth reincarnation. The lifetime is a circle, and the next lifetime will partially repeat the former one. So while there is change within any one cycle—cosmic or human—each

Mark Mosko is an anthropologist at Hartwick College.

Most predictions of the future, once enough time has passed, are seen to be much like the present that spawned them. Jules Verne foresaw rockets like trains, while this glowing depiction of "any city 50 years from now"—a model built circa 1930—was clearly devised by someone to whom the Chrysler Building was still exciting. The shoulders of the skyscrapers look like 1930 refrigerators.

The Bettmann Archive, Inc.

cycle repeats elements of other cycles. Essentially, the Hindu future holds a unending repetition of the past.

This cyclical perspective is quite common among cultures of the world. Indeed, even in Western cultures we tend to break time up into days, weeks, months, seasons, years, generations, etcetera, which reveals a pervasive use of repetitive cyclical time. Consider especially our notion of "life cycles." Certainly the beginning of a life is distinct from its end, yet we along with peoples of many other cultures tend to equate birth and death. Through the progression of seasons, the natural world emerges rejuvenated. In a parallel way, the human spirit also does not die. It too, as our culture sees it, is reborn upon bodily death. I suggest that by thinking in terms of these cycles, we gain a measure of confidence, order, and intelligibility, because the cycles let us foresee a fate consistent with the perceived structure of the whole universe.

Still other patterns for describing time are found among the world's cultures. Quite commonly time is broken up into contrasting and alternating phases. There is night, for example, then there is day, then night, then day, and so on. Summer/winter, wet season/dry season, peacetime/wartime, and sacred time/profane time are additional anthropological instances of making sense of time through alternations.

As with cyclical time but distinct from linear time, alternating time is repetitive, so that future events can be reliably predicted by past events. If it was night, and now is day, then night will certainly follow.

Moreover, note that in certain situations we Americans use this alternating temporal order side by side with cyclical and linear views of time. Usually, as we switch from one mode to the other, we do not notice even the mildest discomfort. Consistent with our various views about "work," for instance, we might first remark upon the monotony of our "day-in, day-out" routine (alternating time); then we might anxiously anticipate starting all over on some new job (cyclical time); but nonetheless grieve for opportunities that are slipping past, never to come again (linear time)—all with the greatest of ease.

Ordinarily, it is only when we argue about the course of future events that the contradictory implications of these various views of time become evident. Compare the familiar image of the political conservative who fights for return to conditions of the past, on the one hand, with the liberal who pushes relentlessly for entirely novel formulations of public policy. Both have the future in view, and both accept the inevitability of change, but the conservative struggles to reclaim a prior moment in time and work from there, while the liberal abandons the past. The clash of their divergent assumptions about the nature of time and consequently of the future makes their political contest unavoidable.

In spite of their various implications for perceiving the future, linear, cyclical, and alternating temporal modes share one element in common. They all assume *change*—whether it be repetitive or non-repetitive—to be an essential aspect of reality. But what if there were a culture that conceived time in a radically different way, one that denied the very possibility of change? Specfically, what kind of future would be conceivable when things *do not* and *cannot* change? Well, the Dreamtime beliefs of Australian Aborigines provide just such astonishing possibilities.

The Dreamtime in traditional Aboriginal culture unified three major kinds of experience: myths and stories of creation, annual religious rituals and activities, and people's dreams. Basically, through their dreams and rituals Aboriginal peoples play out the events and interactions of their own ancestors, ancestors of whom they are the living reincarnations. However, the Aborigines take this association to a remarkable extreme. From a Westerner's point of view, it would appear that they constantly rewrite the past to match the present. They argue, though, that they have the same names, same personalities, same possessions, and same relationships as their ancestors. Indeed, in some essential way, living Aborigines *are* their own ancestors. Therefore, whatever people do and observe "now" in their Dreamtime activities is what they have always been doing and always will be doing. In their cultural beliefs about the Dreamtime, past, present, and future are completely collapsed into what has been called "everywhen."

It might come as a surprise for some to discover these same four modes—linear time, cyclical, alternating, and non-changing time—expressed in the theories of modern Western science. With the notion of entropy, according to the Second Law of Thermodynamics, time is linear and non-repetitive for all matter and energy in the Universe. Similarly, biological evolution proceeds through time linearly, without repetition or reversal. The motions of the planets as described by Kepler and Newton exemplify repetitive, cyclical time. And in astrophysics, some versions of the Big Bang theory involve alternating phases of expansion and contraction of the universe. Finally, the concept of equilibrium in chemistry, as well as Steady State theories that vie with the Big Bang theory, each presume (at one level) a notion of constant, non-changing time and homeostasis—very similar to Aboriginal Dreamtime.

Need I mention that each of these kinds of scientific theory projects a different kind of future, just as any cultural system does? And here we may detect another explanation for why accurate predictions remain so difficult.

In addition, quite apart from concepts of time, predictions of the future reflect the facts of the present as we see it. To be deemed relevant, or even to be understood, any description of the future must to some extent be grounded in the present. The more the predicted future derives from the familiar today, the more it will be believed.

We can see this clearly, I think, in the genre of science fiction, which usually explicitly deals with the future. Why, otherwise, should so many societies depicted in science fiction take on the form of past or present societies, or combinations of both? Why is any truly novel form so novel in science fiction? The remaining traces of feudal aristocracy have been dwindling throughout this century, but intergalactic "empires" of the year 20,000 A.D. or whenever are often constituted of feuding dukes, barons, princesses and kings. Why? What is the hidden sense of projecting neolithic tribal and chiefly forms of society into the 21st century?—albeit adorned with ray guns, thought control, and travel at the speed of light? Even the images of the totalitarian state commonly transported into the future undeniably reflect the facts of our present experiences as much as anything else. As many devotees insist, what is best in science fiction is not fictional.

Indeed, the future changes as a direct function of changes here in the present. It is re-conceived constantly, as an ongoing amendment to traditions stretching deep into the past. As things change now, our view of things in the future tends to change accordingly. Specific predictions about the future, therefore, may or may not "work"; they may or may not have "real" foretelling value. But each prediction has value in telling us much about our ideas of ourselves and our place in the universe, much about the values and culture of our present. By placing the future in its wider cultural context, perhaps we can better decipher the things which vitally concern us now.

When the World Future Society assembled to find today's solutions to tomorrow's problems, we climbed aboard Spaceship Earth . . .

FUTURE BOUND

By Gina Maranto

When I arrived at the Sheraton Washington Hotel for the opening ceremonies at the Fourth General Assembly of the World Future Society, the central air was in overdrive. It was a hot, humid Sunday afternoon, typical of D.C. weather in July. In a cordoned-off area in front of the registration desk, waited several dozen luggage-strapped people. "Futurists," I noted, were capable of being late.

Several thousand on-time futurists, meanwhile, were weaving through labyrinthine chrome and mirror corridors, dressed in a bewildering array of styles. There were people wearing polyester three-piece suits, people wearing bleached Levis. Summer wool pinstripes, Indian-print cotton dresses, digital watches, long hair and beards, Birkenstock sandals, high-heeled open-toed shoes, khaki shorts, close-cropped hair and clean-shaven faces. Was this Berkeley, the boardroom, or the boardwalk?

On my way upstairs to the press room, I crossed paths with a pigtailed little girl wearing espadrilles. She was yelling up to a compadre leaning over the mezzanine rail above. "You *have* to get your briefing packet from the *press* room," the girl shouted, very harried. "Then you'll know *everything* you need to know." Her compadre contorted himself against the rail. "But where," he plaintively asked, "is the press room?"

In his own way, that perplexed eight-year-old had asked one of the main questions that the Assembly was supposed to answer: Given that there is information in the world, how does one get access to it? More important, with the proliferation of so-called communications technologies—cable television, video, computers, fiber optics, direct transmission satellites, and a horde of permutations and combinations thereof—*who* will have access to *what* information? And what will they do with both access and information?

I too, of course, had to find the press room. And then I had to wade through a flood of information, to learn that the theme would be communication, with 600-plus speakers and 3,200-odd participants. Over five days, there were to be several dozen symposia and seminars, nightly "Paper Fairs" (where authors would discuss and defend their notions), and 290 90-minute sessions in which artists, computer specialists, corporate long-range planners, economists, educators, full-time futurist networkers, military advisors, professors—and others—would attempt to scope out the role that communications would play in times to come. In the process, they would attempt to forecast the fate not only of societies, but also of humanity and life itself.

I made my way to the opening ceremonies through a maze of branching corridors, atria, and areas with too many exits to the

Sheraton Ballroom. It was gargantuan, badly lit, and two-thirds full. About halfway up the aisle, a row of yellow-shirted children, including the espadrilled girl and compadre, fidgeted and chattered. They were reporters for the *Children's Express* newspaper, and two teenage staff members were having a hard time marshalling the restless ones. A petite blonde in braids flipped the conference volume open and read aloud, " 'The future of the arts is one that will be modified and undoubtedly impaired by the technological society in which we live.' " Slapping the volume shut, she repeated with worldly exhaustion, " 'Undoubtedly impaired,' oh, I can tell I'm not going to like this." I wasn't at all sure whether she meant the next 50 years or the next few days.

WFS president Edward Cornish took the podium. Cornish, a powdery-looking man, has written that the Society's purpose is to further the "creation of a world future network that can provide a basis for the global wisdom we desperately need to manage our planet during this period of convulsive change." In his opening speech, Cornish reiterated that message, and said it was the task of futurists (the society boasts close to 40,000 members in 80 countries) to find solutions to the world's problems, and to use new technologies to help people understand their options. He admonished the audience, "Your task is urgent and important because the real changes that will lead us to a sustainable planetary future won't happen openly, but in the hearts and minds of people. You should take your task seriously, but enter into it with a festive spirit."

Several items in that brief speech were to re-echo throughout the conference. First, Cornish used the global "we," always speaking in terms of "our planet," "our options," and "what we must do to solve our problems." This usage reflected the view (not a new one) that we're all in this thing together and that the life of, say, a lesser bureaucrat in India has a bearing on the life of an auto mechanic in Montana, and vice versa.

Then, the term "sustainable future." "Future," as the word was used at this conference, did not always mean tomorrow and the day after, but referred to a pervasive system of organization. (Capitalism, or nation states, or Roman Catholicism, to name a few, are such systems of organization.) A "sustainable future," then, meant a system able to last for a long time, without destroying itself or life in general. (Of course, precisely what such a system would entail depended upon the perspective of the speaker imagining it, and perspectives varied.)

Finally, in Cornish's speech, there was the notion that people working together, "thinking globally, acting locally," to use a phrase coined by the late René Dubos, can change the world for the better. There are several assumptions here. One, that those with power, whether governments or individuals, must eventually give in to the will of the people. And, two, that access to information gives people power. And, that an individual's free determination of his acts is the most desirable condition of human life.

At this point, however, many futurists diverged. Some wanted individual freedom worldwide, and believed that easy access to communications technologies—computers, satellites, telephones—would bring about worldwide democratization. In this way, current economic and political systems would become obsolete, giving way to holistic, organic arrangements. Others, though desiring much the same end—democratization—did not either anticipate or want current systems to wither. Governments, they said, are necessary and have simply to adapt.

"Man," the soft-spoken George Gerbner began his keynote speech, "is an animal who lives in, of, and by his fantasies. He is a storytelling animal." Gerbner, dean of the Annenberg School

Is 1984 Coming True?

Next year would be just another year if it weren't for George Orwell's novel *1984*, that nightmarish vision published in 1949. Are Orwell's predictions coming true? Here is a checklist.

— Big Brother. The ruler of Oceania, his enormous face gazes out from posters hung everywhere. "BIG BROTHER IS WATCHING YOU," the posters proclaim, and Big Brother sees everything. He is also infallible, and is kept that way by the Ministry of Truth (Minitrue), at which Winston Smith works. Each day Smith is given copies of obsolete news articles, books, and speeches that need to be rectified. For instance, when Big Brother makes a speech predicting a Eurasian offensive, but the Eurasian front remains quiet, Smith has to "rewrite a paragraph of Big Brother's speech in such a way as to make him predict the thing that had actually happened." All copies of the original speech are then destroyed. In this way Big Brother is never wrong.

— *Doublethink*, which enables most citizens to accept such blatant contradictions. A form of "reality control," *doublethink* allows one "to be conscious of complete truthfulness while telling carefully constructed lies." This process makes possible the three Party slogans: "War is peace, Freedom is slavery, Ignorance is strength." Unfortunately, Winston Smith finds himself unable to practice *doublethink;* he is thus guilty of *thoughtcrime*, an offense punishable by the Thought Police in whatever fashion they choose.

— Newspeak, a language in which unnecessary words are destroyed, thus diminishing the range of unnecessary thought. For instance, Smith gets this assignment: "times 3.12.83 reporting bb dayorder doubleplusungood refs unpersons rewrite fullwise upsub antefiling." Translated into less efficient standard English: "The reporting of Big Brother's Order for the Day in the *Times* of December 3rd 1983 is extremely unsatisfactory and makes references to nonexistent persons. Rewrite it in full and submit your draft to higher authority before filing."

— A new, efficient way of dealing with crime: vaporization. The Party needn't waste time putting criminals on trial; the Thought Police simply arrest offenders, kill them, and have their names struck from any records. The offender becomes an unperson and the offense ceases to exist.

— Development of new crimes: *thoughtcrime*, to ensure goodthinkful citizens, and *sexcrime*, to ensure that all of a citizen's vital energies are focused towards the good of the Party, instead of being squandered in selfish pursuit of pleasure. And to make sure that neither *thoughtcrime* nor *sexcrime* goes unpunished, there is *facecrime*. Maybe the Thought Police can't always catch you in the act of criminal thoughts or pleasures, but they can always fall back on the old standby: they don't like the look on your face.

— Two-way television, the better to monitor Party members. Each morning Smith is awakened by his television, which turns on automatically and orders him and every other citizen to take part in "the Physical Jerks," the morning calisthenics. When Smith does not quite touch his toes in one exercise, the television screams at him: " '6079 Smith W! Yes, *you*! Bend lower, please! You can do better than that.' " No one can change the channel or turn the TV off.

— A new balance of world power that ensures perpetual peace through continual war. The three world powers—Oceania, Eurasia, and Eastasia—keep their economies humming by waging war against one another. It hardly matters who is fighting whom—Oceania has allied itself in the past with Eastasia against the brazen enemy Eurasia, and has switched its alliance to Eurasia to fight Eastasia. The point is, an enemy is vital.

— New sociological advances, such as the 60-hour work week and the public hangings of prisoners of war; as well as breakthroughs in the arts, such as the novel writing machine and the "versificator" (or songwriting machine); and new forms of community activity, such as Hate Week. (It is supplemented by the daily Two Minute Hate.)

If you don't see these developments by next year, though, you can't relax yet—this might be a checklist for 1985. For at the start of the novel, when Smith writes the date in his diary, "he did not know with any certainty that this *was* 1984. . . . It was never possible nowadays to pin down any date within a year or two." —PR

Population Trends

A decade ago, the Club of Rome report "Limits to Growth" had questioned whether the planet could supply the resources—food, water, energy, clean air, sheer breathing room—needed to support continued growth of population and industry. Demographer John Kantner doesn't question that such inherent limits to growth exist. He just doesn't think world population will ever reach the point where resources are stretched to the breaking point.

Kantner, who heads the population dynamics department of the Johns Hopkins School of Hygiene and Public Health, sees birth rates plummeting around the world—in east Asia and southeast Asia, in Costa Rica, Chile, parts of the Caribbean. The situation in less developed countries, he declares, "is more optimistic than we could have thought ten years ago."

Countries along China's perimeter were first to record a drop. In places like Korea or Taiwan, says Kantner, "they're not squeamish about telling their people what to do." In other countries, industrial and urban development sent husbands off to the cities for work, leaving their wives alone back in the villages. Family planning programs have also helped.

Not that population won't, for a time, continue to climb. According to World Bank and U.N. estimates, a century from now there will be about 10 billion people on the globe. "There is a momentum to population growth," Kantner says—"sort of like a flywheel that stores energy." Youthful populations, a legacy of once-high birth rates, produce new babies. That, combined with a precipitous decline in death rates since World War II, means it may still be several generations before world population levels off.

When it does, there will be far-reaching side effects. Until recently, demographers spoke of a "population pyramid" in which the young are markedly overrepresented: for instance, Indonesia's 135 million people in 1975 included about 23 million younger than 5, but less than half that many between 30 and 35. In more "mature" Japan, on the other hand, a population roughly the same as Indonesia's had only 10 million people in its under-5 category—about the same as the nine million in its 30–35 age group. As development proceeds, says Kantner, Japan's type of "slab-sided" pattern is what the world is coming to.

The consequences of this new pattern? One can be seen as the U.S. debates what to do with the Social Security system, now that proportionately fewer young people support a growing elderly population. What Kantner calls "a different opportunity structure" in the working world may be another, marked by more second careers. He even sees high U.S. divorce rates as an almost inevitable by-product of these demographic trends: a low birth rate yields fewer children to "hold the family together." Living apart becomes more affordable.

And as populations shift, says Kantner, the world's geopolitical landscape is changing. Migration is making Germany more Turkish, Britain more Pakistani, the United States more Latin. And "heterogeneity," he comments, "means problems." Meanwhile, the slowing of growth in the West, coupled with continued growth for the next few generations in the developing countries, could mean "an entirely new world"—in which nations like India, Indonesia, or Brazil will become powers to be reckoned with.

—RK

of Communications at the University of Pennsylvania, thinks that art, medicine, statecraft, law, and the rest are fabricated through three sorts of stories which intertwine to shape the world: stories about how things work (fiction), about how things are and were (news and legends), and about values and choices (sermons, instruction, commercials).

In pre-Industrial society, Gerbner said, ritualistic storytelling was a "centralized, stylized, institutionalized, socializing element." During the Industrial era, now passing, the printing press and its issue, the book, weakened the ritual. "A book, an encapsulation of knowledge," explained Gerbner, "could be smuggled across hitherto impenetrable boundaries." Now able to communicate over long distances of time and space, storytellers received information about other societies. Conscious of different interests, they began to break up narratives and tell tales from multiple points of view.

Today, Gerbner said, in the post-Industrial age, the cycle has come full-circle and stories are told mainly by television. Akin to the storytelling of the pre-Industrial age, TV is "an instrument of mass ritual." Americans watch, on the average, 6½ hours of TV a day. They have few programs to choose from. Consequently, this "tribal religion" is able to convey an extremely homogeneous and limited set of stories to a great number of people—stories about a world that is shown as male, white, middle-aged, and crime-ridden.

Cable TV, video, direct transmission satellites, and computers offer a way out of such a world, Gerbner feels, because they give viewers more choice and more chance for control. Instead of being run by distant corporations, such channels might be collectively owned and locally operated. "The question to ask about these new communications media," he concluded, "is not 'Will they make our offices more efficient?' but 'Will they make our humanity more efficient, humane, equitable, and peaceful?' We should ask about the stories we'll be able to tell and weave. Will they enrich and diversify, or limit and confirm inequities? As we construct our future communications networks—which determine how we are able to tell stories—we define ourselves."

The lights came down, and for the next 12 minutes—it seemed longer—we were bombarded by a multi-image presentation on

Henry R. Martin

Photograph of the residents of the world. Missing: Wong (China), Lambert (U.S.A.), Gonzales (Mexico).

communications technology, prepared not by WFS but by the National Audiovisual Society. A Star Wars-type soundtrack, decibels too loud, accompanied fast-cut stills of gleaming equipment, smiling workers, absorbed students, vivid charts. A voice-over narrative offered a paean to technology. In the future technological society, the narrator boomed, everyone will have access to information via computer, satellite, teleconferencing, picturephone™. No one will commute to work; they will "telecommute," hooked up to offices by phone and computer. Shopping will be done right at home, too. Through cable television, video, interactive television, entertainment will take on whole new dimensions. As mankind gains "ever greater" ability to acquire, manipulate, transport, deliver, and duplicate information, all human life will be enriched. People will begin to realize their true potentials! A triumphant crescendo. Magenta and chartreuse images machine-gun across the screen. The thing was over, as were the opening ceremonies.

On Day Two, near the entrance, someone was handing out flyers. They proved to be a warning: "BEWARE THE REVENGE OF PROMETHEUS." Its diatribe was compellingly senseless:

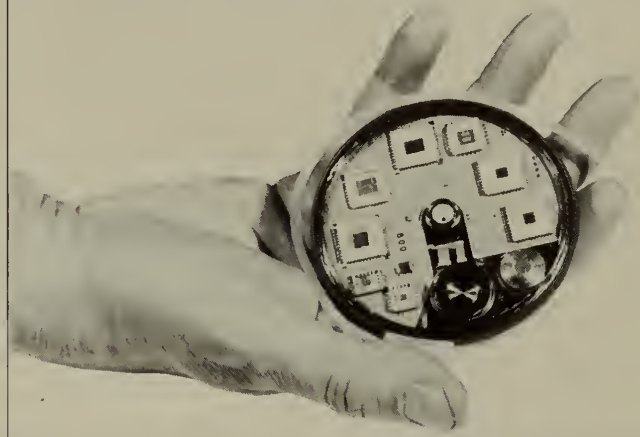
> If you believe this conference is anything but a huge psychedelic brainwashing session, read the program again. . . . The futures movement is the 20th century update of the Roman Empire's bread and circuses policy for social control in a period of collapsing living standards and population. . . . As the population was decimated by waves of plagues, famine, and the infertility resulting from the popularity of homosexuality, the infamous Roman sporting events were expanded until they occupied almost as much time as do rock'n roll, television, video games, and parapsychology fads in the life of a Futurist today.

I decided to take my chances and headed for Session 1101, a seminar on "Images of the Communications and Information Era: An Overview."

Willis Harman, already speaking as I squeezed into the auditorium, is a sanguine-complexioned professor of engineering and economic systems at Stanford, and a senior social scientist at the Strategic Environment Center of SRI International in Menlo Park, California. As I found a space on the floor, Harman was saying, "The future of the globe depends on our reevaluating our situation. We're moving into a time when a major fraction of our workforce is going to be engaged in the processing of information and the creation of technology to handle that information. But I think we need to ask ourselves what all that technology and information is for. We've been very good up until now at answering the 'how-to' questions—how to put a man on the moon, how to split the atom—but we haven't been so good at the 'what for' questions. It's important to realize that economics and technology aren't goals, but tools."

Harman was taking up where Gerbner left off, with talk of assessing values. He went further and pinpointed two currently accepted assumptions which, he insists, must be discarded if there is ever to be a "global society." One, the assumption that people can be defined by their role in the mainstream economy. In the past 30 years, Harman said, people have stopped thinking of themselves as people. Instead, they consider themselves "consumers" or specialists. Partly as a result, he argued, economic logic has been the prime shaper of society—but economic imperative isn't a suitable basis for social decisions. Though Harman believes people should rise up and insist that economic logic is no longer legitimate, he also hinted that the current system, "kept going in large part by armaments production," will even-

An Artificial Pancreas?



Imagine this: You are one of the 10 million Americans who have diabetes mellitus, the disease in which the pancreas fails to produce enough insulin to control blood sugar levels. Yet you need no insulin shots, nor is your diet restricted. Instead, a three-inch, pancake-shaped device has been implanted in your body. It contains a microcomputer, a ten-year battery, and a vial of insulin; your doctor has programmed the computer to meter out your insulin over a 24-hour cycle. In addition, you can tell the computer to prepare for, say, a "light snack." (Actually, you punch a code number on a control box.) And the implant gives you exactly enough insulin to take care of a light snack, just as your body should do. The computer records blood sugar fluctuations and can deliver the records to your doctor over the telephone; if necessary, the doctor can reprogram your implant. Your insulin comes in a highly concentrated form developed especially for this device. You go in to the doctor's office every few months for a refill.

This device is called a Programmable Implantable Medication System, or PIMS, and it is not a daydream. Used to deliver insulin, it is already working well in dogs. A variety of other applications are being developed by a team of engineers and scientists at the Johns Hopkins Applied Physics Laboratory and physicians at the Johns Hopkins Medical Institutions. (This is the same team that developed the first rechargeable cardiac pacemaker in 1973.)

The first human PIMS implant will likely call for release of morphine into the spinal fluid, to relieve intractable pain in cancer patients. In this application, as with the "artificial pancreas," a key feature is that PIMS can deliver such a finely calibrated dosage. With diabetic patients, for example, blood sugar level would never swing far from normal—thus perhaps eliminating some of the long-range effects of diabetes such as blindness and cardiac problems. In pain patients, the pain would never be allowed to grow unbearable.

Another advantage of PIMS is that it can deliver a drug straight to the affected organ, as well as to the blood system as a whole. Thus it may eventually prove a good way to deliver cancer chemotherapy to a particular organ, such as a kidney. Cancer drugs are engineered to kill cancer cells, but they injure all cells, causing side effects like nausea and hair loss. If they could be released slowly, steadily, and in minute amounts directly into the affected organ, the effect on the cancer should be maximized, the side effects minimized.

The obvious question: Could a microcomputer be programmed and equipped to detect, say, a rise in blood pressure (or drop in blood sugar) and respond appropriately? Yes, it could, and such a device, the SAMS—Sensor Actuated Medication System—is now in the planning stage. Here, you don't order the device to respond to "light lunch"; it *knows* you need the insulin and delivers it accordingly. "The likelihood that continuous automatic control of blood pressure can be achieved is high," says APL's Robert E. Fischell, inventor of PIMS. SAMS might also be effective for hemophilia, recurring blood clots, and various diseases of the nervous system.

—William Buchanan

tually collapse. "In order to have a world economy that continues to grow as it has over the last 20 years or so, we would have to create one billion jobs by the end of the century. Where are those jobs going to come from?"

The second outworn assumption: War is an acceptable means for solving international problems. "War is impractical and crazy. It's obsolete," said Harman. Like *The Fate of the Earth* author Jonathan Schell, he sees nuclear war as the end to civilization as we know it. "There's no way we can feel secure as long as world peace is based on the balance of terror. And I think, as does Schell, that there can be no solution of the nuclear dilemma with the present economic and political configuration. There's no solution short of reinventing the world. Non-proliferation measures merely buy time. They may not buy very much time."

The aside, "if we don't blow ourselves up first," was made again and again by various speakers. Buckminster Fuller said it. Russell Peterson, president of the Audubon Society, said it. Nearly everyone threw it in as a subclause somewhere—with the notable exception of Herman Kahn, head of the Hudson Institute and proponent of the winnable war theory.

As Harman finished, I hurried upstairs to Session 1109, "Communication for a Sustainable Society." There, Russell Peterson, who is also chairman of the Global Tomorrow Coalition, echoed Harman's theme, the inefficiency of economic logic. "The GNP as a measure of productivity is blind. Whether a country is producing carcinogens or rice doesn't make any difference in the GNP. Where it does make a difference, though, is in the quality of life.

"What determines quality of life? Well, I think we can certainly say that the opportunities for life and quality are reduced by putting toxic chemicals into the environment, or by blowing up the world some afternoon." The bulge of laughter subsided and Peterson continued. "I think work is one of the things that determines the quality of life. It's hard to find a human being who doesn't want to have a job. And yet we have huge numbers of people unemployed in this country. My own feeling is that we ought to give available jobs to those least able to compete for them—the rest of us could take care of ourselves." At that, Peterson sat down to enthusiastic applause.

Then Peterson, Lester Brown (president of Worldwatch In-

THE FUTURE ACCORDING TO DISNEY

Walt Disney's greatest dream," the Experimental Prototype Community of Tomorrow (EPCOT), has opened to an expectant public. EPCOT was an idea that absorbed Disney during the last years of his life. Almost 20 years in the making, EPCOT was initially intended to be what its name implies: an experimental city, master-planned by the engineers of the imagination—the imagineers.

According to Walt's vision, in EPCOT private enterprise could demonstrate its ability to solve tomorrow's problems, using an actual, inhabited city as laboratory, inspiration, and showcase. EPCOT was to be a city without slums, unemployed, or political machines, a city to which science and technology could be applied in an innovative and experimental way. Perhaps even more importantly, the city was to inspire new science and technology to emerge from the wellsprings of private initiative.

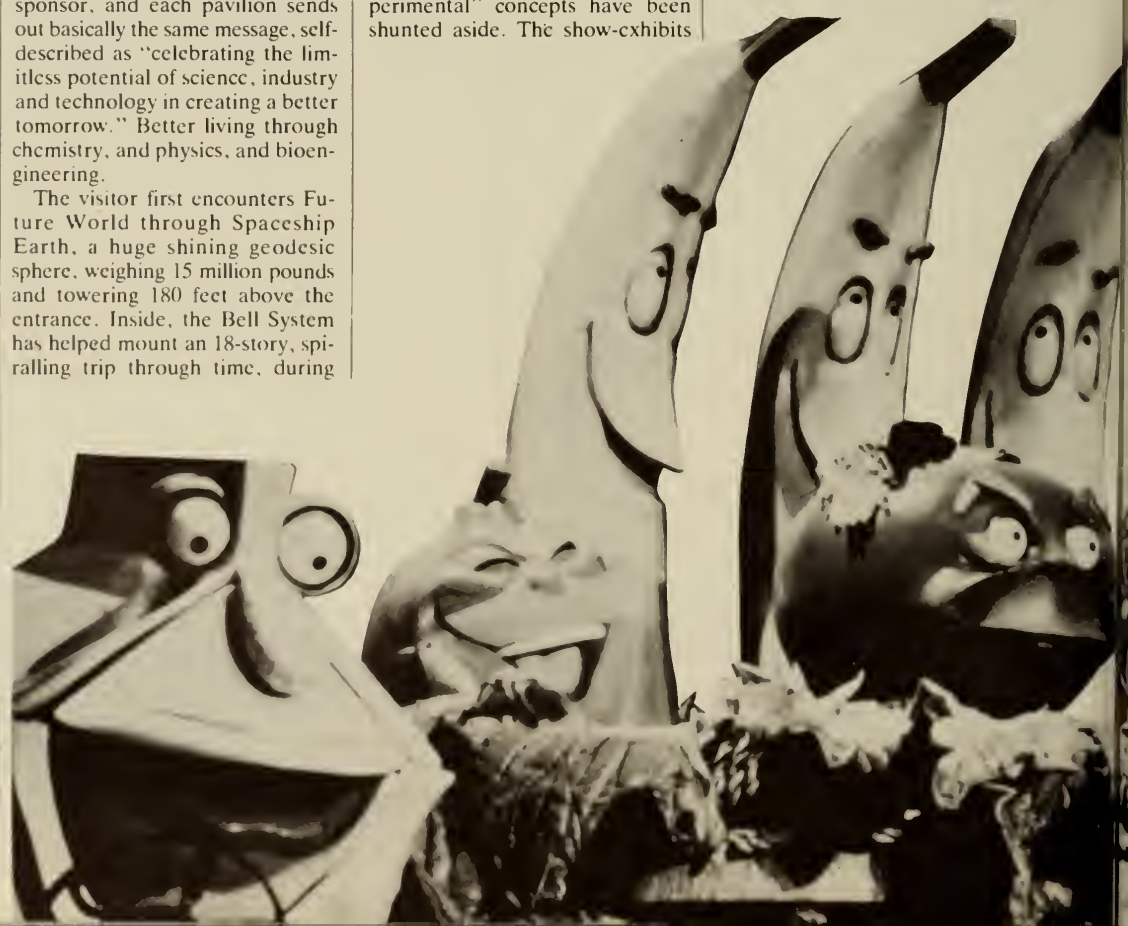
For this purpose Disney acquired a huge parcel of land near Orlando, Florida and sought (and received) the cooperation of the Florida state legislature and local officials. But the concept has evolved away from Disney's original idea. Even a complaisant Florida legislature and Disney showmanship could not turn a town of living people into an experimental prototype—one without politics and some measure of self-determination. A community cannot be engineered as if it were a transportation system. What the dream has become is Epcot Center, a spectacular, billion-dollar "educational entertainment park." Part of Walt's plan, however, EPCOT as a showcase for the latest technology, has been retained by Disney's heirs.

The heart of Epcot Center is Future World, a striking collection of architecturally intriguing pavilions. Each pavilion has a corporate sponsor, and each pavilion sends out basically the same message, self-described as "celebrating the limitless potential of science, industry and technology in creating a better tomorrow." Better living through chemistry, and physics, and bioengineering.

The visitor first encounters Future World through Spaceship Earth, a huge shining geodesic sphere, weighing 15 million pounds and towering 180 feet above the entrance. Inside, the Bell System has helped mount an 18-story, spiralling trip through time, during which the history of communications is colorfully presented using audio-animatronics (robotic animation) and electronic special effects. Other pavilions, on motion (General Motors), energy (Exxon), and imagination (Kodak), use similar approaches.

With all the showmanship in these very popular pavilions, the "experimental" concepts have been shunted aside. The show-exhibits offer thumbnail histories, rapidly bringing the audience from prehistory to the present, with only the most perfunctory nod to the future—a car shaped like a teardrop, a recreational vehicle that inflates for use.

There is one exception. Perhaps the pavilion closest to Disney's original concept is The Land,



stitute), and Robert Rodale (chairman of Rodale Press, Inc.) answered questions from the audience.

Q: You didn't talk much about the population problem, and I think it's a very important one. When you look at what the population is going to be in 2000, you see that we can't afford to do without nuclear power. But a lot of environmentalists associate peaceful nuclear with bombs.

Lester Brown: And so should you. Next question.

Q: How do you get the message about the things we need to do across to a non-reading public? Most Americans don't read.

Russell Peterson: Oh, there are plenty of ways to reach people. You can do it through classrooms, at luncheons of civic organizations, through women's organizations, through 4-H and Scouts, just wherever you are. You have to inform people before you can motivate them.

Robert Rodale: People cannot act against problems without information, because many solutions to problems are quite complicated. I believe we need to create a technical secretariat, as John Freedman suggests in *Retracking America*, to help foster an interplay between planners and the public. That's what we're trying to do with our Cornucopia Project, in which we're trying to create a forum for ideas about improving U.S. food production and to let people know about the way the food system is controlled.

Russell Peterson: I'd like to make a comment in reply to the earlier question about population. Population is a tremendous problem, but in every area but Africa, we've seen a significant slowing of growth. A farmer in Thailand may not understand the intricacies of world trading that create inflation in his country, but he *is* able to see the relation between the number of children he and his wife have and the quality of his family's life.

Toward the end of this session, Brown asked someone seated in front to make a brief statement. The man launched into a rapid, compressed analysis of what he called the "global diseases": the war disease, the population disease, the environmental disease, the consumption disease. I later learned that this was Rashmi Mayur, environmental scientist, vice president of the Global Futures network, and resident of Bombay, India. The ubiquitous Mayur worked his way into many discussions.

By mid-morning Tuesday, I realized that hardly anyone was talking about the future the way the canned commentator in the multi-image show did. Rarely, during the whole five days, did I hear anyone describe a gleaming Tomorrowland. The future most speakers talked about was amorphous, exceedingly general. On the whole, they focused on inequities and dangerous imbalances in current world systems. They extrapolated loosely from the present, concluding that something must be done if humankind, and life itself, are to survive. The future, if things continue as is, will be horrific, many seemed to say, but things don't have to continue as is because we have the power to change them. Their attitudes swung parabolically—down into gloom when they talked about the future-as-extension-of-the-present, and up into hope when they talked about, well, a "sustainable future." A "better" world, a global village, a more just and less hierarchical society, an ecological whole Earth system: these were the vague positive shapes of their hoped-for future.

Like most utopian visions, it sounded lovely, but I doubted the likelihood of its ever arriving. It was unlike most utopian visions, which are generally presented as ends *sans* means. This future—and finally, it did seem to be a single entity made up of many parts, like a jellyfish—seemed to be an extension of grassroots organization and high technology. In other words, the means become the end.

Buckminster Fuller and Herman Kahn, whom many consider archetypal futurists, challenged pessimistic attitudes about the world's fate. Fuller did so indirectly, by way of his unbridled ingenuity, Kahn not so indirectly.

At first glance, Fuller and Kahn might seem to be at antipodes. In many important ways they are, but they do share a common belief: that people are capable of solving the world's current problems to bring about a bright future.

Fuller spoke at Monday's luncheon. The day before, he had unveiled a Dymaxion World Map the size of a basketball court, on which red tiddlywinks represented the destruction nuclear warheads could wreak. The tiddlywinks—one for each nuclear warhead on earth—had obliterated all the landmasses but Antarctica.

Nine years ago, I heard Fuller speak at California Institute of Technology, and it was sad to see that he now has slowed to a cane. His speech, too, has slowed. At 87, he no longer thinks out loud at a near incomprehensible clip. As always, though, Fuller ranged far afield, elaborating and illuminating his fundamental tenet that humanity can survive on Spaceship Earth

sponsored by Kraft. The Land is billed as one of the most technologically advanced display centers in the world—and it is. Under a six-acre structure visitors are ferried along canals through desert, prairie, and rain forest eco-systems. Along the trip, actual experimental cultivation schemes are being carried out: "outer space" lettuce and soil-less tomatoes.

The vision of the future as laid out in Epcot Center is true to the form established in all of Disney's previous ventures. Like Fantasyland, Adventureland and Main Street, Future World is a world without stress, violence, social problems, wars or cares. Disney prided himself on his optimism, but his optimism was of a restricted sort: a view that was upbeat because it admitted no disturbing realities. In striking contrast to most other visions of the future common to the 20th century, Epcot Center's future is defanged. Science, technology, imagination and private enterprise will work together to lead us to a clean, safe, pleasant world—a world with no divisiveness or squalor. People come to Epcot to be entertained, and the education imparted must be consistent with entertainment. The future according to Disney is comfortable and, above all, familiar. It is the future according to Norman Rockwell.

Familiarity is the essential ingredient in all of Walt Disney World. From Main Street to Future World, stereotypes, nostalgia and glossy-magazine images are recalled from the audience's mental and emotional storehouse and made concrete. The message is bland, but the mode of presentation aims to be spectacular. The secret of Disneyworld is the triumph of technique over content. Truly, here, the medium is the message.

—Robert Kargon,
Professor of the History of Science
Johns Hopkins University

A cast of Audio-Animatronic foodstuffs stars in the Kitchen Kabaret, a musical review on basic nutrition at The Land, an EPCOT pavilion sponsored by Kraft.

Epcot Center

ROTATING BUILDINGS?

The human race has moved, from caves to castles to high-rise apartment buildings, and all three residences have one thing in common—they're difficult to heat. So what's next, now that we've become so energy conscious? Well, how about a mobile highrise, one that follows the sun? Or a house whose walls open up during the day and close at night, like the petals of a flower? These are some of the future architectural developments envisioned by Professor Walter M. Kroner, director of Rensselaer Polytechnic Institute's Center for Architectural Research.

Kroner says that today's buildings are static and too limited in function. Seasons change, weather changes, people's needs change—but buildings remain the same. He offers several examples of "dynamic architecture" based on the premise that technology now exists to make buildings more responsive to changes in environment.

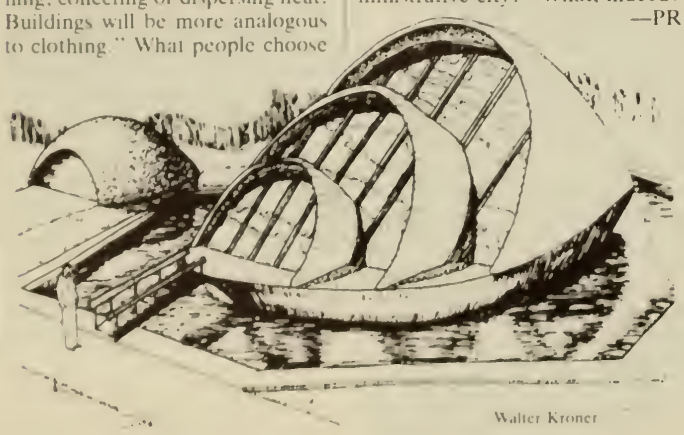
"If you're walking into a cold wind," Kroner notes, "you turn your back to it." He says we should design buildings that can rotate to turn an insulated face to the north or to windward. Rotating restaurants have been built atop hotels, and railroad switching yards use turntables to rotate heavy locomotives. "If we can build a Saturn rocket—which is analogous to a skyscraper—and move it to its launching pad, we can build a movable skyscraper, or one that rotates on a fixed base to track the sun." Buildings floating like oceanliners could do the same thing. Kroner also envisions buildings that submerge like submarines to protect themselves from bad weather.

These visions belong to a distant future, he admits. "Closer to reality—or acceptability, I should say—we can have buildings with walls that change from morning to evening, collecting or dispersing heat. Buildings will be more analogous to clothing." What people choose to wear each day depends at least partially on the weather, he explains. "On a cold day, you wear a sweater. If the day warms up, you take it off." Houses, too, could respond to the weather. Kroner says that walls can be designed that react to heat and light, so that on a warm day, the walls open up or become more permeable. On a cold day, the walls close up and gather heat from the sun. "Water can be pumped through the walls to radiate heat where it is needed."

Kroner envisions another change that could conserve both energy and space. As it is now, he says, we have many single-use buildings, such as churches, theaters, stadiums, or the lobbies of office buildings. A building that sits vacant for five out of seven days is wasteful. Buildings can be designed to serve multipurposes, or to serve both public and private needs. For example, a theater, which has a sloping floor, could be built with a hydraulic lift to make the floor flat, so the building could be used as a gymnasium when it's not in use as a theater.

Finally, Kroner suggests a new approach to city planning. As it is now, most cities are autonomous. Each has its own cultural and entertainment centers, business and shopping districts. Kroner envisions a time when each city will specialize in a single service; cities will be connected by high-speed transit. "In this way, you reduce the requirement of every city having all things for all people." Does this mean that you might work in Washington, shop in Philadelphia, and catch a show that night in New York? Kroner does not find that far-fetched, pointing out that this country already has some highly specialized cities. "What is Las Vegas but a big fun city? What is Washington, D.C. but one big administrative city?" What, indeed?

—PR



Walter Kroner

by using technology to do "more and more with less and less."

"When I was young," he began, "humanity was remotely deployed on the globe. If I went up into the second floor of our house, I could see 14 miles every way to the horizon. People normally stayed close in, inside those horizons. Our conditioned reflexes were based on our seeing a lot of each other.

"We all walked a lot within those boundaries, and we wanted to know how far we went, so we wore pedometers. According to those pedometers, the average person walked about 1,100 miles a year, and rode about the same. After World War II, a salesman drove 30,000 miles a year, an average person about 10,000, and they walked the same 1,100 miles.

"Shortly after World War II, people were moving about every five years. They no longer stayed inside those horizons. Now, it's closer to every one-and-a-half years. One-and-a-half years," he mused. "It seems incompatible with 30-year mortgages, doesn't it?" Pained laughter.

"Now we've got the highway system," Fuller went on, "and humanity is going in different directions. The old customs, laws, and the shapes of the cities have nothing to do really with the way we now live. We have to look at the whole world now to know what's going on.

"In the past 50 years or so, we've begun more and more to move from what I call the visible reality to the invisible reality, X-rays, radio waves, electricity—we use resources, 99.99 percent of which no one knew were there when I was born in 1895, and 99.99 percent of which are non-contactable by the human senses. I think there's enough of everything to go around," concluded Fuller. "It depends on how we utilize what we have. A geodesic dome, for instance, uses a small fraction of the materials that a conventional structure takes."

On Wednesday, I heard Kahn speak. He looks like Henry VIII with wire-rimmed glasses. "A lot of people don't like the undercurrent of optimism and hope that runs through my work," he began his extemporaneous talk. "A lot of people call me an eternal optimist. Actually, with the manic pessimism in this country, a realist—and that's what I really am—looks like a manic optimist. Pessimism pervades this country.

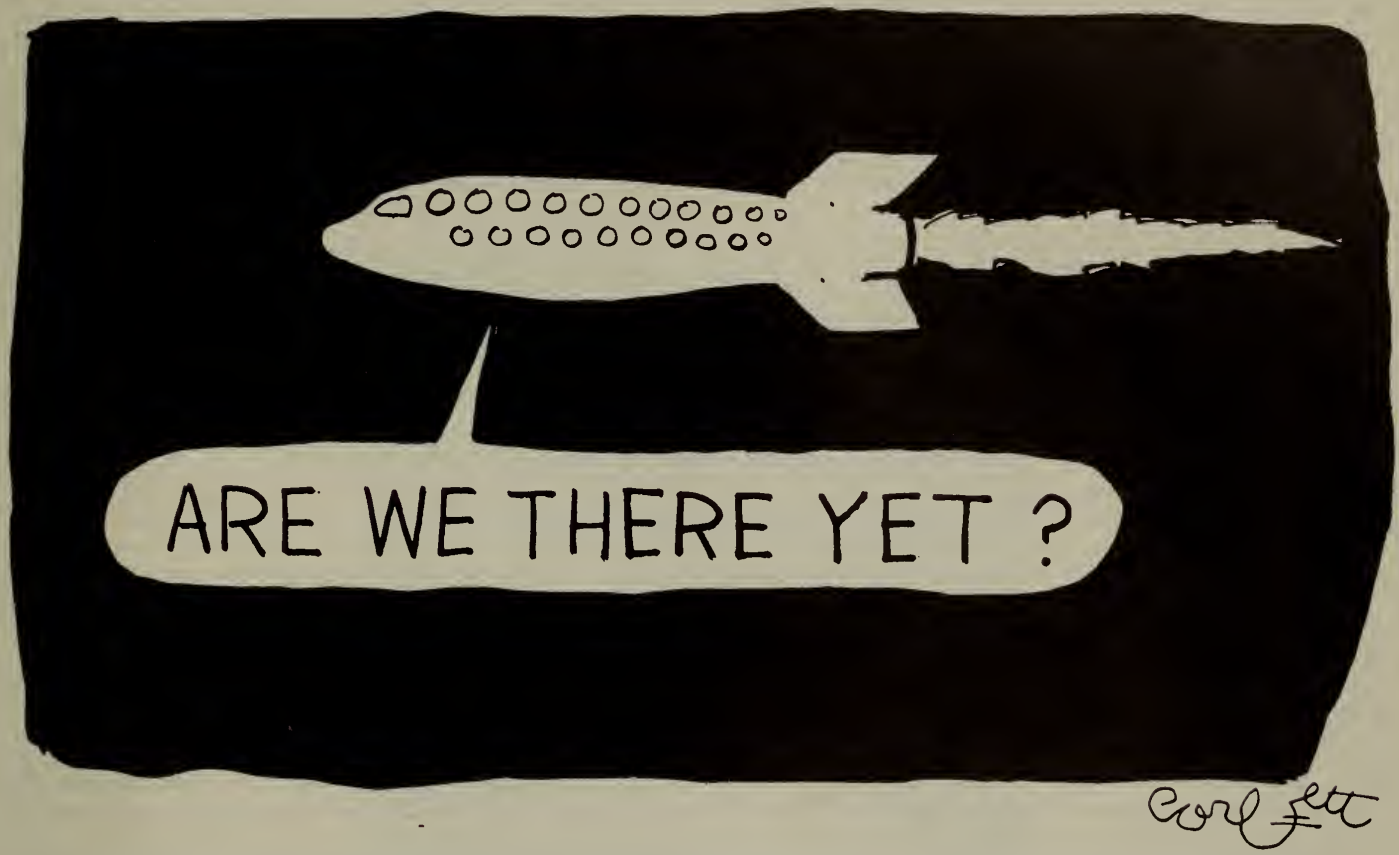
"People seem unable to see what's in front of their faces. In fact, that's been true since I was a kid. One time in elementary school, the teacher said, and everyone in the class agreed with her, that wars never settle anything. What did she mean, wars never settle anything? Of course they settle things. I got into a big argument and lost. While everyone else was out for recess, I wrote on the board '32 Things Settled by War.' Number one, American freedom from England. Number two, the possession of Mexico. Number three, and on. Everyone came in from recess and we got in another big argument and I lost again. But I was right! This country, particularly the press, suffers from what Webern calls 'educated incapacity.' People are overeducated, and have an inability to deal with problems.

"Every major issue that you can name in the last decade—law and order, busing, gun laws, pornography, sex education—has been mishandled by the press. Did anyone ever think that busing kids long distances to bad schools was the way to solve the black problem? I could have told them it couldn't be done in a democracy. It can't!

"The whole business about the energy crisis is one of the biggest hoaxes of all time. It simply isn't the case that we'll run out of fossil fuels—it's not possible. What are some of the conceptual frauds the press has perpetrated about oil? 'Gas prices have been going up for the last decade,' that's one. In fact, in terms of the fixed 1972 dollar, oil has gone down 20 percent.

INTERGALACTIC TRAVEL

Taking the Kids Along



"OK. The press claims that demand is going to continue to grow and that we're going to run out of oil. As a matter of fact, according to Exxon projections, there's going to be a drop in demand over the next decade. That's already started to happen. What were the mistakes that the press made there?" A slide goes up: "They ignored the possibility and probability of the following: energy conservation; accelerating U.S. and worldwide production; breakthroughs in petroleum technology; changes in the structure of OPEC; unconventional sources of oil and gas; *in situ* conversion; and the early arrival of long-term technology.

"If there's an energy problem it's because there's too much governmental restriction of strip mining, nuclear power, and oil and gas production. That's what is causing stagflation, not the budget deficit. If you look at the debt in constant dollars, you'll see that the debt has been paid off many times over the past decade by inflation.

"The information you receive through the media is highly slanted toward pessimism. But I can tell you, there are good things to come." Kahn didn't tell what those things were; he said we could read his book.

By this time it was obvious that most futurists see basically two avenues to a sustainable future: technological advances and people networks. I moved on to two sessions which promised me an overview of the former.

Session 2201: There Robert Lucky, exuberant executive director of Communications Services at Bell Labs, outlined some of the esoteric refinements now being tested at Bell. Take microelectronics. Fingernail-size chips which carry 250,000 bits (units of information) now exist. But, said Lucky, "you ain't seen nothin' yet. It's scary. We're getting to the point where we think a 600,000-bit chip is perfectly possible."

And then there's photonics, the use of optical fibers for sending messages. Bell has already installed 15,000 miles of optical fibers this year, 25 times more than in 1981. A single optical fiber can replace a bunch of copper wire thick as a thumb and carry up to 90,000 conversations. "Now we're experimenting with sending pulses that are only femptoseconds [fempto = one-quadrillionth] long—a femptosecond is so short that light only travels one-fifth the length of a human hair in that time—so that we could send a billion messages before Bell would even earn a penny—not that Bell is thrilled with that prospect. Using femptosecond message units, every conversation going on in the U.S. at one time could be carried by a single fiber."

Some more "mundane services" that Lucky said Bell may soon offer are:

1. A telephone number attached to person rather than place. "You could dial a friend, and wherever he was, the phone would ring."
2. A phone which tells who's calling before you pick it up.

3. Data communication networks for people or companies who want to share information.

4. Picturephone[TR] meeting service, like a conference call with visibility.

5. "Intelligent" telephones which can send electronic mail, check your calendar for you, and look up numbers in your personal directory.

6. Information kiosks with touch-sensitive TV screens which will give you information about restaurants, hotels, rides (Disneyworld has a test kiosk), then give you access to a data base with additional information.

7. A Good Samaritan computer in your car which gives information such as the best route from Tucson to Tucumcari, tells which stores are open along the way, and offers advice. (If people do this, it's called back-seat driving.)

8. Home information systems which let you plug into local library listings, train times, newspapers, etcetera. People in Coral Gables, Florida are testing a prototype for Bell.

9. Remote control of appliances by phone. In addition to turning on and off the oven, the 600 families in North Carolina testing this system are able to arrange phone hook-up with utility companies to draw power out of plants at non-peak hours and store it. Power stations are spared brownouts, and people get energy at low rates.

10. Computer games. Besides being able to dial bridge partners and play a game via terminals, Lucky thinks you will eventually be able to dial a number and drive a Grand Prix race on a realistic track shown on the terminal screen.

Of course, said Lucky, these developments depend on someone finding enough money to pay for them.

Paul Strassman, a PhD in strategic planning from MIT, now a vice president with Xerox Corporation, took the microphone and put a big damper on Lucky's tinkly forecast. "My colleague's talk exemplified the quintessence of the supply-side mentality—there's a plethora of gadgets, if people could only afford them. I'm here to tell you about the harsh reality of the demand side." Basically, Strassman doubts that capital will be available, either in the U.S. or globally, to get everyone onto the high-tech bandwagon. Right now, he argued, there is a "misallocation of capital to the workforce." Worldwide expenditures for information technology or hardware, he said, "are quite low. Only a small number of countries are buying equipment today."

Even in the U.S., distribution of hardware is less extensive than one might think. When you look at the cost of dealing out word processors and other information paraphernalia to the workforce, Strassman said, you see that there are great barriers to getting, say, 50 percent of the workforce supplied by 1990. Business would have to increase its capital investment to approximately $25,000 per worker to do that—roughly double the present per worker investment. "It's hard to take resources that have been going somewhere else and apply them to this. Unless business learns how to increase capital investment, particularly in equipment for managerial and technical workers, I'm not optimistic—despite the tremendous power of the new technology, and the fact that it's highly profitable—that we'll see worldwide adoption of these technologies."

But what happens when the technologies are adopted? You get something like California's Silicon Valley. "Silicon Valley," said Everett Rogers, organizer and moderator of Session 1410, "is one scenario—warts and all—of the future. Others being Route 128 in Massachusetts, Silicon Desert in Dallas, and Silicon Mountain, Colorado Springs."

The session speakers had seen the future. Did it work?

"California," quipped Jorge Schement, associate professor at Annenberg's branch at the University of Southern California, "is different from the rest of the U.S. It's weird, but it has to be taken seriously. It has 3 percent of the labor force in the country, and produces 25 percent of the agricultural products. If California were a separate nation, it would have the thirteenth largest GNP in the world."

Fifty-one percent of the labor force in California works to produce, recycle, or maintain information. That number is growing, and Schement's studies show that workers are shifting mainly out of jobs in the agricultural sector to take up positions in the information industry.

But there is a problem. For the information sector to keep growing, California needs more workers with high- and middle-level skills (engineers, programmers, writers). The state would prefer not to import those workers, so an intensive education effort is needed, which in turn requires talented teachers and professors. But because industry can outbuy school systems, colleges, and universities, Schement said, California schools are in for trouble. Where are they going to get the teachers? "California simply has to educate its masses, and that's why, in many ways, it can be called a developing country."

In addition, the balance of power may shift as the workforce becomes increasingly divided into high-skill and low-skill groups. "Having an elite labor force can be tricky. If the poor have many votes, that translates into a kind of power. But if you see an increasing concentration of voting power in the hands of the income rich—which is what we're seeing—then what will happen?"

Some of the social costs are obvious already, said Judith Larsen. Larsen, a senior research assistant at Cognos Associates, showed slides of Silicon Valley, the smokeless factories cheek-by-jowl down a 20-mile section of the San Francisco peninsula. "Not everything is ideal," she commented. Some 6500 acres of prime farmland vanished in the feverish period between 1950 and 1975, when 37 landscaped industrial parks were constructed. Longtime residents were driven out and housing costs rocketed. In 1950, there were 78,000 housing units in the area. In 1975, there were 325,000 multiple-dwelling units (apartments, condos), and 500,000 single dwellings (many in communities zoned to require at least five acres per dwelling). The influx of people still overwhelmed available housing. High rents and housing costs drove low-level workers 20 and 30 miles away, to San Jose or San Mateo, to find affordable housing. Public transportation is "dismal," said Larsen, so bottom-level workers are tied into a long commute on the overcrowded Bayshore Freeway (known as the "Bloody Bayshore").

These results, claimed Everett Rogers, are the logical extension of forms of production in the information industry. In the hands of both U.S. and Japanese supercapitalists, Rogers said, information technology—both its production and implementation—only magnifies the gap between rich and poor.

Discussions of new technology were fairly straightforward: Here is the hardware, now what are we going to do with it? When it came to the other means to change, people, discussions could follow weird and circuitous routes. Take session 2306, for instance.

Session 2306 met in the enormous Washington Ballroom, which was jammed. As soon as I saw who was at the table on stage, I knew why: there had been a shrewd PR campaign. Earlier in the day, I waited through an endless line to the phone bank.

WATER, WATER EVERYWHERE

Each person on Earth needs two liters of water each day to stave off dehydration. While the average person in the United States uses 700 liters daily (washing, cooking, watering lawns), an estimated two billion people worldwide lack an easily obtainable supply of safe water. In rural sections of Third World nations, women and children may spend eight hours each day traveling to and from the nearest source of water.

The United Nations has declared 1981–1990 the International Drinking Water Supply and Sanitation Decade, but will the ambitious program, undertaken in an era of global economic woes, succeed? "I'm one of the skeptics," says environmental-health engineer Kazuyoshi Kawata. The program, says the Johns Hopkins School of Hygiene professor, "has already failed in many areas, although Latin America is doing better than Africa." Abel Wolman, a Hopkins professor emeritus and an international water expert, agrees: "Real progress has been made only in Central and South America, the regions with greater resources in skilled manpower and monies." The African deserts continue to grow.

In contrast, predicted water shortages in the United States take on what planners call a "local" aspect. "For the U.S. as a whole," says M. Gordon Wolman, a Johns Hopkins environmental engineer, "there is not a shortage of water. There *are* areas of intensive use—parts of the Southwest and the Plains states—which may not be able to continue using water as they have." Solutions? Changing from agriculture to less-water uses of the land, better water management, or—in the distant future—importing water. Everyone will still have enough water to drink. Barring natural disasters, of course. "If an earthquake destroyed the aqueducts that Los Angeles depends on," warns Theodore Crusberg, of Worcester Polytechnic Institute's biology and biotechnology department, "L.A. would be in big trouble."

Cities around the world, including those in so-called developing nations, already face a common problem. Most urban water systems were built early in the 20th century, with pipes made to last 50 or 60 years. In many cases, those pipes have been in place 70 years or more. Kawata tells stories of paper-thin pipes in Cairo, of pipes in Manila so corroded that the area through which water can flow is less than half the original cross-section.

Ed Thorsett

Closer to home, the New York City public-works department is said to avoid touching some of its water valves, fearing that the corroded valves would burst if turned. Each year, Baltimore City loses an estimated 18 percent of its water through leaks and "unaccounted-for water." Utilities workers still find wooden pipes in use in many cities. "We're about 20 years behind in maintenance of all systems," estimates Abel Wolman, "both water and wastewater." The solution is "rehabilitation. It means orderly planning of major repairs, work that will cost billions of dollars, but which will have to be done on a piecemeal basis, year by year."

Corroded pipes mean lost water; they can also mean impure water. In fact, says Gordon Wolman, "water quantity may not be the problem—it may be water *quality*." Daniel Pope, director of the Freshwater Institute at Rensselaer Polytechnic Institute, agrees. An expert on Legionnaires' disease, he studies what he calls "a whole new set of diseases related to modern technology—and related to water." Cholera and salmonella are no longer threats for industrialized nations; PCBs and other carcinogens are. The danger of groundwaters contaminated by hazardous wastes is real, says Charles O'Melia, a wastewater expert at Johns Hopkins.

One possible solution is a return to ocean dumping. The sites, of course, would have to be carefully picked. "It depends on what the substance is," says O'Melia. "Some should be placed where they can be dissolved, carried away." He adds, "I don't think it will be good for the ocean, but it may be necessary."

Another threat to water quality is acid rain, much talked about in the press. "Evidence is gradually accumulating," says Gordon Wolman, "that acid rain is more of a problem than many would have predicted a decade ago—with damage to lakes and rivers, as well as deleterious effects on forests, soils, and materials." Liming lakes in New York's Adirondacks, for example, to restore proper pH balance is what Daniel Pope calls "a great solution—so long as you don't have to do it every year." But Charles O'Melia warns, "It's not going to be a single-shot process. Lakes are still going to receive acid rain, and the sediments at the lake bottom are also acidic."

And, finally, what about "the greenhouse effect"? It's too early to tell, says Gordon Wolman, but a real warming-up of the Earth, over the next 100 years or so, could mean the melting of polar ice caps. The sea level would begin to rise, flooding coastal areas. "It's happened before," he notes with a geographer's long-range vision.

—MRY

When I reached the head of the line, a woman with voluminous skirts and Medusa-like hair put her hand over the mouthpiece of the phone she was monopolizing and said, "What medium are you from?" Medium? She had noticed my press badge. "Have you heard about the mind-to-mind session this afternoon?" she asked. I said that I had, but planned to hear Rashmi Mayur talk about communications and global economic development. "Don't go hear *him*," she said, "he always says the same thing. I hear this mind-to-mind thing is going to be great. They're supposed to reveal the results of some research that's never been discussed yet." I shrugged, she went back to her phone and—back at the Washington Ballroom—who should be sitting on stage? Who else but my informant, Carol Rosin. This medium, I said to myself, has been manipulated.

James Beal, an engineer for Martin Marietta, began the session with a talk about the need to unlearn the definition of reality that has been imposed on us. How? Via various Asian mind/body disciplines (such as tai ch'i), externally imposed low frequency sound, harmony generators (?), vertical swings, sensory deprivation tanks. Biofeedback. The electromagnetic inducement of sense data. The Neurophone—a thing that emits a "scratchy, thin frequency" which shifts you into your creative, non-verbal right brain and allows you to "empathize and pick up on people's attitudes, to know what's wrong with them."

Soon, Beal thinks, even newer technology will lead us into a new world of enlightenment. Soon it will be possible to feed sound and light straight into people's heads. There will be ways to actually record experience, a vacation, say, and replay it so you feel again all the things you felt then. (All of them? I hoped Beal or someone else would devise an editing mechanism.)

Then Thomas Beardon, a "senior advisory engineer" (no affiliation) from Huntsville, Alabama, took the mike, saying, "Nothing that you take for certain now is certain." Beardon's baritone and unshakable delivery made him sound like a TV evangelist. "Scientific method does *not* yield truth," he intoned. "Time is not objective. Scientific instruments destroy time in the very act of measuring it. Scientific instruments only measure a partial reality." (So far, it sounds familiar—but wait.)

"What do we lose when we measure only part of reality?" Beardon demanded. "What is the only thing that occupies time but no space?" He paused portentously. "Being!—We understand from spatial relativity that time can be converted into length. That means instruments can be built to measure mind! I won't go into it here, but take my word for it. Such instruments exist!

"Nikola Tesla discovered the 22 flaws in electromagnetic theory and he was suppressed. Why? Because he would have provided free energy to the entire world. [Tesla, an electrical engineer, worked with high-tension electricity and alternating current transmission, among other things, and designed the power generating system at Niagara Falls.] I won't elaborate here, but it

Corn Stalks into Chemicals?

The age-old practice of burning wood for energy is inefficient and lacks finesse. In the near future, wood—and biomass in general—will likely be used in cleverer ways. With modern-day alchemy, biomass can be transformed into cattle feed and paper pulp—as well as a number of products normally produced from petroleum feedstocks. In fact, according to Rensselaer Polytechnic Institute engineer Henry R. Bungay, wood chips, corn stover, and sugar cane will soon compete with hydrocarbons for a share of the chemical manufacturing market.

Supported in its early stages primarily by Department of Energy grants, most research on biomass conversion has sought cheap alternatives to fossil fuels, such as methane and methanol. Bungay, however, a professor in RPI's chemical and environmental engineering department, argues that while such fuels are technically feasible, they're economically impractical. Better, he wrote in a recent survey in *Science* magazine, to convert wood or high-cellulose agricultural leftovers into valuable cellulose pulp, lignin, and glucose-rich syrups at a competitive cost.

The bulk of biomass used in such operations would come from two main sources: trees and corn stover.

Corn stover—what's left of plants once ears have been harvested—is normally plowed back into fields for erosion control and to provide organic nutrients necessary to soil health. The topic is controversial, but Bungay says that as a rule of thumb one half of every crop should be plowed under to aid nitrogen fixation; the rest could go to biomass conversion. The best source of wood would not be fast-growing pine, already farmed for lumber, but fast-growing hardwoods such as poplar, which can be coppiced to increase yields. Nurseries experimenting with this method of pruning have harvested as much as 15 dry tons per acre per year (normal stands in the same area only yield one to two tons). It is also possible to use other feedstocks: pilot plants in oil-poor Puerto Rico use a special strain of "energy" cane which provides enough growth to satisfy both sugar refining and biomass conversion needs.

Given a bunch of high-cellulose biomass, there are several ways of refining it, many recently developed. All result in the decomposition of the biomass into its three main components (or variations thereof): cellulose and hemicellulose, carbohydrate polymers which can be broken down into sugars; and lignin, the tough polymer that

is now possible to take matter apart like a pretzel and put it together. Using Tesla's scalar longitudinal waves, I can take that table apart and reassemble it over there, without doing any work!"

A lot of people turned towards the back wall, waiting for the table to de/ and rematerialize. It did neither.

Beardon resumed his oration, unfazed. "What are the implications of this? It means that we now have the ability to shake up the stream of time. If the stream of time is shaken up, it's like being on the end of a log bouncing in water."

Beardon said he sees three possible futures. One, that inconceivably horrible weapons which shake up the time stream will be set off, bringing about the "Armageddon described in the Revelations of John." Two, that cities will be tied by electromagnetic energy, creating a "primitive nervous system" and raising the level of the collective unconscious. Three, that all people will take their fates into their own hands and utterly change the world, becoming one great body with eight billion hands. Beardon ended by saying that if he had 10 million dollars and the right eight people, he could bring about scenario number three in two years.

As Beardon concluded, Barbara Marx Hubbard, the Futures Network president, stood up, leaned to the microphone, and said, "This is too exciting to say sitting down." Hubbard, an energetic woman with short, ash-grey hair, proceeded to describe a "fundamental experience" that she had had one day in 1966 while walking on a road in Lakeville, Connecticut. Her voice wobbled with excitement as she talked.

She had been reading Reinhold Niebuhr on community. Niebuhr had quoted the Christian apostle Paul, who said, "All men are members of one body." Hubbard had gone for a walk and as she reflected on Paul's idea, she suddenly rose out of herself and saw the Earth as Gaia, who was gasping for breath. Hubbard felt as if she were a cell in the body of earth. Then she felt the body reaching into outer space, and "with that common focus, the entire world began to link together in total joy and empathy. It was an ecstatic cosmic event. I heard the statement, 'Our story is a birth,' and then there was what I call a planetary smile. I was bathed with divine light and surrounded by love." Hubbard then went out into space and experienced the Big Bang, the formation of the universe, and the development of organisms from single cells to multiple-celled beings. Finally, she became "a little stick figure again, walking down a road in Lakeville, Connecticut." Hubbard said she realized then that the people of the earth had the option of Armageddon or the planetary smile.

A British fellow stood and asked Hubbard if music had been connected with her vision, because he thought music was integral to universal harmony.

"Yes!" said Hubbard. There had been tones which were disharmonious, then gradually merged into harmony. "Why don't we try this? Why doesn't everyone here make their tone, and we'll see if they become harmonious? I don't have a strong voice, but I'll begin." Hubbard made her tone into the microphone, something akin to A-flat above middle C, and a sizable portion of the audience made their tones, and lo and behold, the tones began to shift before our very ears. A bearded man rolled his eyes at me, and we both pushed our way toward the exit.

Later, a 75-year-old man from Port Jefferson, Washington asked me if I'd been to the mind-to-mind session. I said I had. "Some of that stuff was mind-boggling, wasn't it?" he said. "It's a good thing we have you people [the press] to wade through this stuff for us, because it's just mind-boggling."

I wouldn't have said it was that. What I would have said is that it was religious. Eagerness to believe had been almost palpable in that ballroom. What was going on there had little to do with analysis, much to do with faith.

As futurists talked about reassessment, reevaluation, reinvention, I still wasn't sure what values were to be embraced when the old were abandoned. Several common threads did run through discussions: that it was necessary to have a global perspective; that the values of Western capitalism and Eastern statism which permeate the world are the source of major problems; that it is necessary to have an ecological point of view; that the new communications technology can help bridge the gap between the haves and have-nots.

Fritjof Capra, author of *The Tao of Physics* and (more recently) *The Turning Point: Science, Society, and the Rising Culture*, spoke about the "crisis of the Northern hemisphere." A physicist at the Lawrence Berkeley Laboratory of the University of California, Capra argued that the mechanistic Newtonian-Cartesian model of the universe, which constitutes the basis of most people's current world view, is outdated. Its "reductionist tendencies" have led to industrial expansion and massive exploitation, he said. "We have overshot the mark with technology. We need, now, to shift to a new paradigm, a holistic perspective that will allow us to deal with complex, inter-connected problems in a non-linear fashion."

Abdul Aziz Said, professor of international development at

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binds the celluloses together.

Products differ depending on the process. For instance, a new technique developed by Biological Energy Corporation, a Philadelphia-based consortium, turns hemicellulose into fermentable sugars and breaks lignin's three-dimensional structure, leaving freed cellulose fibers almost intact. Such cellulose can be sold as high-quality pulp for paper manufacture. Other methods leave the cellulose in bad shape, but allow lignin to be extracted intact: a method akin to that used in the production of Masonite board explodes wood chips by high-pressure steam. The chips are then enzymatically broken down into a sugar-rich syrup which can be fed to cattle; and into a lignin residue. Lignin, it has been discovered, is a cheap substitute for the chemical phenol, used in wood glues. Phenol recently sold for 35 or 36 cents per pound; lignin, selling for 23 or 24 cents, would cost 7 or 8 cents to produce, says Bungay.

There are problems, of course. Enzymes for breaking down cellulose are expensive, making enzymatic refining only marginally economical at present. And when solvents are used there is an absorption problem: heating or washing pulpy chemical soups to recover expensive solvents adds to production costs. But, says Bungay, solutions to these problems are near. New biological techniques are bringing down the price of enzymes, and when oil prices rise again, biomass conversion will probably be profitable.

On the pollution front, biomass conversion looks good. Most systems are closed, meaning very little waste is emitted, and there are few by-products, since a large percentage of the initial biomass feedstock is converted into the end products. Some of the end products could be burned to fuel the factory itself.

Bungay believes the technology will be beneficial to other branches of the chemical industry as well. Coupled with the pine chemicals industry, high-pressure steam explosion might produce cheaper and more homogeneous turpentines and resins, as well as saleable cellulose. But Bungay is pessimistic about biomass ever supplanting fossil fuels. "It just doesn't make sense," he says, "to build a fancy modern plant that starts with a feedstock and makes a feedstock. The profit on that kind of venture is bound to be slim. Biomass has a much better chance of competing with the petroleum industry, which refines about 7 percent of its stocks into chemicals." —GM

THE FUTURE OF/ IN LITERATURE

Literacy, not the Atom, was humankind's most traumatic experience with a technology. After the Greeks had alphabetized their speech, apparently in quest of a way to keep bureaucrats' records, what streamed from living mouths got routinely analyzed into packets called "words," thought of as "out there" in space, with consequences so disruptive to the human psyche that only years of expensive education can adjust them. Political Science, for instance, is a remedial course for people who would otherwise let their literacy persuade them that "Democracy" exists in the sense that "pigs" do.

Like the Six Million Dollar Man, it goes without saying, we benefit. If you'd had hydraulic transistorized mega-muscles implanted, would you want to go back to the kind that have spasms and run on Wheaties? No more does anyone yearn for the blessings of illiteracy, though Homer seems to have thrived before the alphabet. But we'd not know of Homer save for the alphabet? True; and what we know is not Homer, no, but his alphabetized simulacrum. Many times over, down the ages, six million dollars have been re-expended to preserve his encoded traces: think of papermakers, scribes, type designers, printing presses, reference libraries, lexicons, chairs of "Greek"; and my ex-colleague Don Howard would have me mention eyeglasses, things unneeded save by the literate. As our earliest bard, Homer is our six *billion* dollar man, the most expensive reputation we have ever agreed to cherish. If we think him worth the expense, then of course we are right.

We exist, in short, in the future of literacy, a future that has been developing since about the 8th century B.C. Literacy, being a technology, welcomes other technologies: in the 15th century Gutenberg's, in the 19th Mergenthaler's, today IBM's. If I type these lines on a computer, that is not strange. The book has no rebuke for ubiquitous, facile, machine-enabled production; the book may have been the first mass-produced article after the brick. (A similarity of shape has been remarked on.)

Keeping James Joyce somewhat extravagantly alive was part of the long effort to preserve Homer. That task was shouldered by an English Quaker lady named Harriet Weaver. She felt guilty about her inherited means, and guilt has its ecological niche, as has literacy. External to its provender as the illiterate imagination can never be, the literate imagination surrounds, cannibalizes, rethinks. Metempsychosis, that is its normal feat; illiteracy only cherishes and repeats. No bookless bard would have dared do to Homer's tale what Joyce did, lest attempting it he'd wipe out the tale he started from. But Joyce was the supremely literate man of our age; for his like, T.S. Eliot thought, you'd seek back as far as Milton. So it came about that the *Odyssey* relives in *Ulysses*, itself unreplaced, with among other odd consequences this, that students have been spurred by *Ulysses* to want to learn some Greek. (And Joyce could not read Homer in Greek.)

He was totally unpredictable, which helps show why the future is. We exist in the spaces between such events: events in a continuum that extends from our first abcedminded* forefathers and will not terminate on account of new fashions in hardware because its habit of externalizing what we are thinking is the software on which they thrive.

Hugh Kenner,
Professor of English
Johns Hopkins University

* Not a typo. See *Finnegans Wake*

American University, added that development is different from modernization. Modernization provides technology; development, on the other hand, is an open-ended process of individual and social discovery. "The Saudis," said Said, "are an obscene travesty of Islam, the way they twist society out of shape to accommodate technology." From Sufi teachings one learns, he said, that events do not happen, but are discovered.

Capra and Said echoed many speakers. On the subject of ecological perspective, Russell Peterson had said, "We have to begin to respect our life-support system. The thought that man doesn't have to worry about the air he breathes, the water he drinks, and the earth he gets food from is utter folly." And Rashmi Mayur insisted that the global diseases can only be eradicated in a moral, ethical atmosphere that takes into account environment. "We are living on a planet totally interdependent and fragile. Its maintenance now depends on us. Since there are one thousand times more of us than there were a hundred years ago, our responsibility is one thousand times as great."

Mayur, wherever I heard him speak, was a voice of cogency and clarity. And he is a difficult person to catch up with. He moved about the halls like an excited atom.

I was finally able to arrange to see him, though, after he had done a radio interview. Mayur shook my hand warmly, even though we had shaken hands four times in the previous half hour, and we gravitated toward a sofa in the hall. I asked him what he thought of the conference, and whether he had noticed how few Third Worlders were present. "Oh yes," he replied. "What do I think of the conference? I think Americans are very myopic and carried away by technology which they think will bring them to Shangri-la. They tend to miss two important things.

"First, the real job of information technology is providing proper information. What is going to be put into the system? That depends on the brains using it. I would say right now there is information pollution, because people are using these systems unwisely. Second, I think Americans don't realize that technology is in the hands of the few, not the many. The globe is starved of information and technology, and we are seeing the widening of the gap between information poor and information rich. Three billion people in the world have no access at all to this type of technology. They do not even have access to TV sets."

Does Mayur mean that the Third World doesn't need the technology? "No," he said, "I am simply challenging that the medium is the message. The Third World needs the message, and it is media-starved, but it is only the message that validates the technological medium, not the other way around."

In the Third World right now, said Mayur, technology is used only by the bureaucracy, the elite. They use communications technology to perpetuate their power. "They do not let people know the truth, and they keep their image before the public constantly." What Mayur and others are working for is the dissemination of information and technology to the common man, and thus, they hope, the dissemination of power. "We want the whole world to have access to technology, and we want the planet to be united."

What if those with power try to resist democratization? "There are too many disenfranchised people," answered Mayur simply. "You cannot put the lid on past a certain point. It will explode." He warned, "If people in the U.S. do not recognize the rest of the world, this great air-conditioned boat will sink in the sea of the world's poverty. We must join with people to bring about a better world. I assure you, we all have the same destiny."

WPI CLASS NOTES

WPI Alumni Association
President, Peter H. Horstmann, '55
Senior Vice President,
Harry W. Tenney, Jr., '56
Vice President,
Donald E. Ross, '54
Secretary-Treasurer,
Stephen J. Hebert, '66
Past President, John H. McCabe, '68

Executive Committee members-at-large
Henry P. Allessio, '61; Philip B. Ryan, '65; John M. McHugh, '56; Anson C. Fyler, '45.

Fund Board
Henry Styskal, Jr., '50, chair; Richard B. Kennedy, '65, vice chair; Gerald Finkle, '57; Allen H. Levesque, '59; Philip H. Puddington, '59; Richard A. Davis, '53; C. John Lindegren, '39; John M. Tracy, '52.

1914

Chester Inman's family gave him a 90th-birthday party at his camp in Princeton, MA, last summer. He reports that 37 of 40 family members attended.

1922

"Squirm" Colesworthy writes that en route to his 60th WPI reunion last spring, he became ill in Pennsylvania and had to stay in a hospital in Chambersburg for three weeks. He says he is now pretty well recovered.

1923

Reunion June 2–5, 1983

1926

Last winter, **Phil Delphos,** while vacationing in Green Valley, AZ, was surprised to discover three WPI alumni living there: **Randy Saxton, Fran Whelan** and **Bob Johnson, '27.** The group got together in February and held the "first alumni chapter meeting" at a famous watering hole in Amado.

1927

Recently, Louise and **Ted Lewis** of New Hampshire visited the **Russ Whittemores** in San Diego, CA. Russ recalls that in 1926, he and Ted, who was captain, were the only two seniors to earn letters on the WPI football team. The former teammates had not seen each other since their 50th reunion in 1977.

Charles Moore continues swimming in Cleveland's Cudell Recreation Center pool and has received a Red Cross certificate for swimming 500 miles between 1971 and 1982.

1928

Reunion June 2–5, 1983

1930

Ed Delano placed eighth in the 75-year-plus class in the Veterans World Cup bicycle races held in St. Johann in the Tirol, Austria, last summer. Says Ed, "There were 17 riders representing every nation in Western Europe [in his category] and I was the only American participating. Many were retired pros, who are still fast. I was happy to come in eighth." Earlier, Ed had competed in various races in Hartberg, Austria.

1932

William Reardon was named board chairman for his fourth one-year term by the Ellis Hospital Board of Trustees in Schenectady, NY, in June. He has been a board member since 1970. A retired manager of engineering for the Real Estate and Construction Operation of GE, he is a member of the Senior Elfun Society. He was presented with the Senior Territorial Award for the Schenectady area in 1982.

1933

Reunion June 2–5, 1983

1935

Lester Libby continues as a consultant in R.F. Design. "Planning to attend the 50th reunion."

1936

Retired Col. **Perry Clark**, who planned to spend the winter in St. Croix, Virgin Islands, is active with church and neighborhood groups at his home in Columbia, SC. He also does volunteer work at Ft. Jackson in the Check Control Program, which tries to curtail check bouncing in the Army by cutting check-cashing privileges of offenders and running banking system information programs.

Earl Curtis and his wife, Esther, write they are "into bus trips." Recently they went by bus to Quebec, the World's Fair and Florida. Earl says he picked lots of strawberries, black raspberries, blackberries and vegetables in his garden last summer.

The **Wally Dahlstroms,** after traveling to Aruba last February, joined WPI alumni for the Alaska trip in August. Wally, a class agent, is past president of the Tech Old-Timers and an officer in the Retired Men's Club of Greendale in Worcester.

Bob Fowler also made the alumni Alaska trip. Because of preparations for a big family reunion in August, he was unable to serve a fifth season as an interpreter at Old Sturbridge Village. He is secretary and treasurer of the Tech Old-Timers.

During the winter months, **Tom Frary** works part time as a warehouse manager for a chain of eight retail stores. He is treasurer of the Frary Family Association and spends June through October "between Marblehead and Martha's Vineyard, MA, and Peaks Island, ME."

Harold Henrickson, who lives at the 62-acre family homestead in Holden, also maintains a second home (65 acres) in Stratton, VT. He enjoys outdoor activities such as hiking, golfing, fishing, hunting, cutting firewood and gardening. He spends part of each winter in Florida.

Brewster Howard continues as vice president of manufacturing at American Saw & Mfg. Co., East Longmeadow, MA. He and his wife, Madeline, like to play tennis in Florida during the winter. In summer he commutes to his vacation house on South Pond in Brookfield, "where we enjoy watching our ten grandchildren learn to swim and water ski."

Nat Levine writes that he and Roslyn recently retired and are now busy with senior citizen activities and travel plans. His career was primarily spent in government service as a civil engineer with the Naval Facilities Engineering Command.

After retiring from Brown Boveri Turbomachinery in 1980, **Ben Smith** worked for several more months for the company, cataloging 44 years of design-engineering work. At home

Ray Moeller: GE's Former Magic Man

He had absolutely no intention of taking a job with General Electric, but at the insistance of the Dean, Ray Moeller, '35, reluctantly took part in a GE interview during his senior year at WPI. "The end result," says Moeller, who is now retired, "was 31 years of the most thoroughly enjoyable employment possible."

Ray, GE discovered, excelled in the area of "special assignments." That meant he was given jobs which nobody had held and which nobody held after him. "A wonderful arrangement. My performance could never be compared with that of anyone else!"

On one special assignment, Ray and five other GE employees were asked to predict the future growth of everything electronic in nature—both inside and outside the company—and to report their findings. They set up office in New York City and commuted weekly to and from their homes by air, living in a different hotel each week. At year's end, they took eight hours to present a summary of their findings to GE's top management.

When GE decided to use Broadway actors and actresses in a nationwide traveling road show to teach nontechnical distributors how to sell technical products in an easy-to-learn fashion, Ray was assigned to the troupe. He wrote his own magician and ventriloquist acts and "felt pretty foolish sitting in a hotel room practicing with a dummy on my knee."

Ray Moeller with his dummy, "Hooker," flanked by an actress and a model at a Los Angeles show in 1953.

On one of his vacations, he went on his own "special assignment," an 18-month leave to sail around the world aboard the *Brigantine Yankee*.

During his entire career, Ray, who is still a bachelor, lived in a country club, where a party was usually in progress and where his living quarters were taken care of by maids. He has never regretted taking that long-ago job interview with GE.

he tore down a carriage house and built a two-car garage. Other interests include church work, Scouting, cross-country skiing and leading "great books" discussions for young people. Recently he spent six weeks in Monterrey, Mexico, on assignment from International Executive Service Corps, helping a large electric repair shop develop capability to rewind large motors and generators. "I.E.S.C. is sort of an industry version of the Peace Corps."

Sted Smith continues in active practice in OB-GYN in Salisbury, MD. In his free time he cruises and races his sailboat on the Chesapeake Bay.

Harold F. Henrickson, Class Secretary

1937

Fran Harvey of Harvey and Tracy Associates, Worcester, was recently elected a new member by the corporators of Bay State Savings Bank. He is a WPI trustee emeritus.

David Femia, '83, a WPI physics major and member of Skull and Sigma Phi Epsilon, is the current recipient of the H. Richard Townsley Fund Scholarship. According to **Dick Lyman**, one of the classmates who helped establish the Fund, the scholarship was started as a class memorial (40th class reunion gift) to **Richard Townsley**, who died in Europe during World War II. Townsley won a Yankee Ingenuity Scholarship as a WPI undergraduate. "I still visit his brothers at the family dairy and apple farm in Ashfield, MA," says Lyman.

John Willard serves as secretary counsel for Harper Co. in East Hartford, CT.

1938

Reunion **June 2–5, 1983**

Bob Abbe writes to say that he recently assisted in the management of a golf course. In addition, Abbe holds the position of treasurer of his borough.

Randy Buck, who is a past president of his local Rotary Club, has also been active in work with his church and with a local historical society. Buck still accepts consulting assignments in fields relating to oil and gas reserves.

Bill Holcomb's company, Homaco, Inc., is flourishing. Currently, the company produces what is known as an automatic call distributer—it's the device that airlines use to tell you to hold the line until an agent is available.

Last September, Mary and **Murray Wilson** celebrated their 40th wedding anniversary. Before his retirement, Wilson worked as a metallurgist, spending 38 years at Revere Copper & Brass in Rome, N.Y.

1939

Walter Abel has been named a senior fellow in technology at Emhart Corporation. In the newly created position, he will advise the vice president of technology on technical strategy and organization. Also, he will be the principal liaison with such associations as Computer Aided Manufacturing-International and the Industrial Research Institute, and with various universities. With the firm (formerly USM Corp.) for 43 years, Abel was named vice president of research in 1969 and vice president of R&D in 1979. He serves on the board of advisors in the department of management at WPI.

John Hughes, who formerly lived in Honolulu, HI, has moved to Tucson, AZ.

Active with the ASME on local, regional and national levels for 35 years, **Dick Wilson** has also served the California Society of Professional Engineers as president of the Long Beach Chapter (1981–1982). Other memberships include the American Institute of Aeronautics and Astronautics and the American Association for Advancement of Science.

1943

Reunion **June 2–5, 1983**

1946

Judge **Ernest Hayeck** of Worcester Central District Court has been elected chairman of the National Conference of Special Court Judges for the judicial-administration division of the American Bar Association. He is also chairman of the group's education committee. Judge Hayeck enjoys reading and has a working knowledge of Arabic, Hebrew, Latin, Greek, French, German, Italian and Spanish. He has fished for marlin in Hawaii and is currently planning a salmon fishing trip in the Pacific Northwest.

Fred Kull has been named chairman of the American Railway Engineering Association Committee 9, Highway Railway Programs. He was slated to be a moderator at the 1982 National Railroad Highway Grade Crossing Conference scheduled for late summer in Kansas City.

Albert Rawdon, Jr., was recently named a fellow of the American Society of Mechanical Engineers. He has worked in the power industry for over 25 years, managing several R&D projects to improve coordinating efficiency, boiler design and the reduction of controlled stack emissions. He was responsible for the layout and construction of a new R&D facility at Riley Stoker, where he currently reports to the vice president of engineering. He has served as a chairman of an ASME subcommittee and as treasurer of the Worcester section. He holds six patents and is listed in *Who's Who*.

1947

Robert Begley holds the position of advisory engineer at IBM in Kingston, NY. He is re-

sponsible for product and development program engineering for display terminals. He has won many sailing trophies, including the Eastern (U.S.) Enterprise Association championship award.

Allan Glazer's firm, Honematic Machine Corporation, Boylston, MA, manufactures special cylinders. Says Glazer, "The lunar module used them for legs. Our biggest claim to fame!"

John Hambor holds numerous patents for transistors, rectifiers and semiconductor networks. He is president and owner of HV Component Associates, Howell, NJ. In spite of a busy schedule, he tries to read a minimum of 75 books a year.

Harry Hoffee reports that he is now semi-retired as a professor emeritus of electrical engineering at Ohio University in Athens. "I teach only in the fall, so we've spent the last three winters in Tucson, AZ."

Bob Mark, still with GE after 35 years of service, manages non-union employee relations for the firm in Fairfield, CT. He is a founding board member of the National Association of Manufacturers' Council on Union Free Environment, which encourages progressive employee relations by employers.

Ed Supple, a special agent for Prudential Insurance Company, Newton Lower Falls, MA, recently was named his agency's leading salesman. He was also a top salesman nationally for Prudential, winning a presidential citation.

Ken Truesdell holds the post of vice president at Circuit Equipment Sales Company in Burlington, MA. He has been a volunteer member of the Connecticut Prison Association for 15 years, "trying to bring something of the outside life to those in maximum security who have few or no other visitors."

1948

Reunion June 2–5, 1983

1950

Dr. **Herman Nied** has been elected treasurer of the Hudson-Mohawk section of the ASME for 1982–83. A registered professional engineer in New York and New Jersey, he is with the GE Corporate Research and Development Center.

1951

Charles Darrell now serves as a senior engineer at General Physics Corp., Columbia, MD. He retired from the Navy last July.

Robert Luce is employed in the FiberGlass Division of Engineering at PPG Industries in Lexington, NC.

1952

Last summer, during a memorable round of golf, **Chester Inman, Jr.,** made a hole-in-one on a par three hole. To prove this was no accident, he proceeded to shank his drive on the next hole into the same cup from which he had just taken the ball after his hole-in-one. Chet was recently promoted to director of facilities, administrative headquarters, at Eastman Kodak Co. in Rochester, NY. The facilities department, which employs about 350 people, is involved with design, engineering, maintenance, cleaning, security, safety and moving.

1953

Reunion June 2–5, 1983

David Beach, manager of product design for Eastman Kodak Co., was the Johnson Memorial Colloquium speaker at WPI in October. He spoke on "Design and Marketing Considerations for the Instamatic and Kodak Product Lines."

Daniel Hoch is currently an assistant with branch office operations at IBM in Waltham, MA.

1954

Walter Dziura has been promoted to director of engineering research and design at Scovill Apparel Fasteners Group in Watertown, CT. He joined the firm in 1954 in the general products division. The certified engineer has been chief design engineer of the sewing notions division and has managed field-equipment research and development.

1955

Bell of Pennsylvania recently promoted **Brian Kelly** to vice president of the marketing department. Now based in Philadelphia, he had been in Pittsburgh as vice president of customer service for the state.

WPI Trustee **Robert Stempel** spoke on "Automotive Competition and the Productivity Challenge" in the second annual lecture of Technology and the Free Enterprise System at WPI in October. A vice president of General Motors Corporation since 1978, he is general manager of the Chevrolet Motor Division.

1956

Donald Olsen has been promoted to manager of generation projects at Northeast Utilities (NU). A member of the Electric Power Research Institute's Air Quality Program Committee, he joined NU in 1968 as a production engineer and in 1978 was named supervisor of generation mechanical engineering.

1958

Reunion June 2–5, 1983

BORN: to Elisheva and **Leo Price** a daughter, Shiry Lee, in October 1981. In June, Price joined the HQ VII Corps in Stuttgart, Germany, where he is chief engineer for plans and services. Previously, he was chief geotechnic engineer for the Corps of Engineers in the planning, design and construction of two major airbases for the Israeli Airbase Program.

Donald Bean has been named director of sales and marketing at Smith Valve Corp. in Westboro, MA. Previously, he was vice president and general manager of Kieley and Mueller, Inc., Middleton (NY) manufacturers of control valves. He also had product and sales management and design engineering assignments with Jamesbury Corp., Worcester.

David Edfors, a project engineer for Lane Construction Corp. of Meriden, CT, has recently been concerned with the building of reinforced earth-retaining walls for the final stretch of I-66 running from the Washington, DC, Capital Beltway east. Experts quoted in the magazine *ENR* estimated that using the retaining walls, originally suggested by Lane, saved the state of Virginia about $8 million in construction costs. Dave is currently project engineer on a $64-million project with Lane, building the western approach to the new Fort McHenry Tunnel under Baltimore harbor.

1959

Wayne Gass, director of physical facilities and assistant business manager at Mount Holyoke College, has been advanced to business manager. He will retain the title and responsibilities of director of physical facilities. His new duties will include business matters and budgeting. Gass has been with the college since 1962. Previously, he earned his master's degree at MIT and his MBA at UMass and worked for Turner Construction Co.

1960

After 17 years at Digital Equipment Corp., **Irwin Jacobs** resigned last summer as vice president of the company's commercial Original Equipment Manufacturing Group in Merrimack, NH. He is now senior vice president of marketing and sales at Data Terminal Systems, Inc., Maynard, MA.

Recently, **Paul Jolicoeur** joined Itek Corporation's Graphic Systems & Communications Industries as vice president for business planning and commercial development operations. He is responsible for business and strategic planning activities and integrates business and product planning performed in five operating divisions (involving 2,000 persons). Earlier, he was with Honeywell, IBM, Mohawk Data Sciences and Nippon Electric Information Systems, holding assignments throughout the U.S., France and the United Kingdom.

Arthur LoVetere, president of MacDermid, Incorporated, Waterbury, CT, was recently elected chief executive officer. He has served as president and chief operating officer since 1977. He joined the company in 1957 and holds an MBA from Dartmouth's Tuck School.

Michael O'Toole, Jr., is now associate director of the Division of Solid Waste for the New York State Department of Environmental Conservation in Albany.

1961

Al Sherman was a coauthor of a three-part article, "Comparison of direct and indirect methods of measuring arterial blood pressure." Appearing in *Medical Instrumentation*, the article was named the best paper published in that journal in 1981. Sherman continues at Hewlett-Packard, Waltham, MA, where he develops computer systems which monitor patients in coronary intensive care units. He received his MS from WPI in October of 1981, "after years of procrastination."

Paul Sledzik is now a general manager for GE in Detroit. His son, David, is a freshman at WPI.

1962

On June 16th, his 20th wedding anniversary, the Santa Clara Chapter of the American Institute of Plant Engineers honored **Art Dobreski** as its "Plant Engineer of the Year." (The largest AIPE chapter in the U.S., it has more than 300 members.) Art and his wife, Carole, have three children: Maureen, 12; Kathleen, 16; and Michael, 18. Continuing with Signetics, Sunnyvale, Art manages corporate facilities operations.

Ron Gagne recently accepted a new position with GE's armament and electrical systems department in Burlington, VT. As manager of armament systems engineering, he is responsible for design, development and production engineering and product support elements for armament systems production programs within the department. The division makes high-speed, multi-barrel armament systems for fixed and rotary wing aircraft, as well as shipboard defense systems. Ron, his wife and four children are located on Mallets Bay on Lake Champlain.

William Krein, controller for Zenith Radio Corporation, has been elected vice president. He joined Zenith in 1980 as controller, following 14 years with GE. He has an MBA from Babson.

1963

Reunion **June 2–5 1983**

Dr. **Robert Desmond** has been named a vice president of the RIT Research Corp., a wholly owned subsidiary of Rochester Institute of Technology. He had been a director of the corporation's energy division. With the company for two years, he joined RIT in 1970, was named head of the ME department in 1972 and served as director of RIT's Institute for applied Energy Studies until 1980. Formerly, he taught at WPI and Clarkson.

Allen Hoffman, associate professor of mechanical engineering at WPI, took first place in the "Over 40" category of the Hubbardston Field Day road race in September. Placing ninth overall, his winning time was 28:54 for the 5.2-mile run.

Francis Kennedy, Jr., was coauthor of "Single-Pass Rub Testing of Abradable Seal Materials" in the September issue of *Lubrication Engineering*. Dr. Kennedy has an MS from Stanford University and a PhD from RPI. He carried out postdoctoral research in tribology at Polytechnic Institute of Bucharest, Romania, in 1973, at RPI from 1973 to 1974 and at NASA-Lewis Research Center during the summers of 1977 and 1978. Since 1974, he has been at Dartmouth College, teaching and supervising students in mechanical engineering and doing research in solid mechanics and tribology.

The Pied Piper of Potomac

The *Potomac Almanac* of Rockville, MD, believes that any man who gets up at 4:30 a.m. every Thursday morning to make breakfast for a church full of teenagers and who opens his own house to 100 young people every weekend for two decades, deserves special recognition. Last June, the newspaper presented Paul Kokulis, '45, with its first Community Service Award.

Why does the successful senior partner of the Washington law firm of Cushman, Darby & Cushman, a devoted husband and father of four, spend so much time with other people's children? "It's simple," he says. "I enjoy them." He adds, "But, I must admit that in the beginning, our home became a teen-age open house more or less by accident."

In the early 1960s, when Kokulis was new to the Rockville area and began teaching Sunday school at the local Presbyterian Church, his pupils started dropping by on weekends. They usually had no money to spend on dates and liked being in a home, as long as it wasn't *theirs*. "My wife and I called our place 'the house of last resort.' "

The Sunday school class spread the good word about the Kokulis hospitality, the impromptu games and the "brass tacks" conversation. The weekend gatherings grew.

Says a neighbor, who characterizes the Kokulis get-togethers as very quiet, "Paul is an oasis. He provides a role model and a listening ear. We all try to live up to his example."

Host of the "House of Last Resort"

Over the years, there have been few problems aside from a broken window and an accidental hot-chocolate spill on a brand-new carpet. (Not a bad record, considering that six active Kokulis "alumni" ended up playing football in the NFL!) In spite of spills and general wear and tear, Mrs. Kokulis enthusiastically backs up her husband's efforts.

Paul and Carolyn Kokulis care more about the quality of life of the local teenagers than about the lifespan of their furniture.

1964

Gary Goshgarian was featured in an Earthwatch advertisement appearing in the September 20th issue of *U. S. News & World Report*. Gary, an associate professor of English at Northeastern University, is affiliated with Earthwatch, whose members support research expeditions in the sciences, arts and humanities in more than 25 countries worldwide. On one expedition, Gary used his amateur diving skills to help a marine archaelogist discover a second century B.C. Roman shipwreck in 135 feet of water off Majorca, Spain.

Thomas McGee, vice president of Petroleum Meter & Pump Co., Inc., was installed as a director of the Petroleum Equipment Institute at its 32nd annual convention in New Orleans, LA, in September. He is president of the Avon (CT) Chamber of Commerce, on the board of the Greater Hartford Chamber of Commerce and on the advisory board of the Northwest Bank for Savings. A member of the WPI special gifts committee, he is also past president of the Avon Jaycees and the Farmington Valley Arts Center. He holds an MBA from Harvard.

Facit/Dataroyal of Nashua, NH, has appointed **Paul Ramsden** vice president of engineering. Previously, he was a project manager at Wang Laboratories and had held posts at SCM Corp., Centronics and Sanders Associates.

1965

Brad Barber holds the post of adjunct assistant professor in the Division of Nuclear Medicine at the University of Arizona Health Science Center in Tucson. He has an MS and a PhD from the University of Arizona.

Mort Gutman was recently named director of printer marketing for Smith-Corona in New Canaan, CT. He is responsible for marketing the firm's newly introduced quality printer and for providing technical direction for future products.

Last summer, **Walter Hipp, Jr.,** was named manager of engineering at Green Mountain

Power Corporation, Montpelier, VT. In his new post, he oversees the engineering department in system planning and the design and engineering of transmission and distribution projects. He also has budgetary responsibilities. Before joining the company, he was a project engineer for CTM Ltd. in Saudi Arabia and planned an electric system for an entire community. Earlier, he was with the Concord (NH) Electric Co.

1966

MARRIED: Lawrence A. Penoncello and Karen A. Eseppi in Winsted, CT, on June 18, 1982. Mrs. Penoncello graduated from Southern Connecticut State College and manages Sportsmen's Paradise II in Litchfield. Larry is manufacturing manager at the Broad Street plant of the Torrington Company, Torrington, CT. He has an MBA from the University of Hartford.

J. William Bowen serves as president of Cash Flow Organization, Inc., New York City.

Formerly located in Buffalo, **Robert Dolan** recently moved to Manchester, NH, where he is a development engineer at GTE Sylvania.

Dr. **Donald Foley,** vice president of PAR Technology Corp., has been promoted to manager of the government systems division. He is responsible for current programs, future research, development and systems implementation contracts. He has a PhD in electrical and computer engineering from Syracuse University. The Foleys and their four children live in Clinton, NY.

Michael Salvini is plant manager for Bedford Wire, a Division of Buell Industries in Bedford Heights, OH. He enjoys golf, antique hunting and his 1963 restored Corvette. He belongs to the American Society of Metals and the Wire Association.

Dave Stone still works for Rohm & Haas Co. and is now based in the Philadelphia home office as project manager in a new plastics products group. He and his wife, Bonnie, have two daughters, Gina, 9, and Becky, 5. Last year, the family enjoyed a trip to the Poconos.

Gary Dyckman, Class Secretary

1967

MARRIED: Stephen F. Nasiatka, Jr., and Judith G. Brown on July 24, 1982, in Monson, MA. She graduated from Westfield State College. He is with the Connecticut Department of Transportation in Hartford.

Robert DeNigris is teaching at the Harrow School outside of London, as part of a teacher exchange program. His usual post is that of mathematics instructor and coordinator of computer sciences at Tower Hill School in Wilmington, DE.

Bill Goudie, a head agent for the WPI Alumni Fund for the past five years, holds the post of senior engineer-Engineering Service Division at Du Pont in Wilmington, DE.

Len Lamberti, an officer in the New England Association for Educational Program Personnel (NEAEPP), recently received a certificate of recognition from the association for outstanding service to New England students. He is director of the Training in Academic Skills Center at the University of New Hampshire in Durham.

Dr. **Paul McDonagh** is now an assistant professor in the Department of Surgery, Yale School of Medicine, New Haven, CT. He has an MS from Columbia and a PhD from the University of California.

Elliot Whipple was recently honored by Texas Instruments (TI) as one of 45 inventors whose patents are considered particularly significant. He is program manager for motor-protection devices in automotive markets. He had worked with TI pressure-sensing devices in automotive and off-road vehicle markets. He has an MS in engineering from Brown and an MBA from Wharton.

1968

Reunion **October 15, 1983**

BORN: to Barbara and **Frank Verderber** their fourth child, a daughter, Kristen Jean, on August 19, 1982. Frank is employed by the Long Island Lighting Co. (LILCo) as a management representative at Stone & Webster, Boston, architectural engineers for LILCo's Shoreham Nuclear Power Station, now under construction. Barbara is a dental hygienist.

Michael Babin has a new post in the Hydro Division at Chas. T. Main, Inc., Boston.

Donald Bergstrom serves as an area superintendent at the Walsh Construction Co. in Waynesboro, GA.

Frank Check, Jr., works as a staff engineer at National Semiconductor, Sunnyvale, CA.

Joseph Paquette is now general manager of the operations division at James Howden America, East Hartford, CT. He has an MBA from the University of Pittsburgh.

1969

MARRIED: Dr. **Lucien J. Teig** and Marjorie E. Cohen on June 6, 1982, in Worcester. She graduated from Worcester State College and is a quality-control inspector at Ortho Diagnostic Systems, Westwood. He is an assistant professor of physics at Yale University. He received his master's and doctoral degrees from Columbia University.

BORN: to Cheryl Weisman-Cohen and **Michael Cohen** their first child, Whitney Sara, on December 8, 1981. Michael is customer support manager of Fund Management Systems at STSC, Inc., Boston. Cheryl is assistant to the director, Language Consultants, Wellesley, MA.

Christopher Cowles is a systems analyst for Neoterics Consulting Services in Darien, CT.

Jim Foley, a member of the technical staff at Bell Telephone Labs (BTL), Murray Hill, NJ, writes that he had a very rewarding year (1981–82) serving as a BTL visiting professor at Southern University in Baton Rouge, LA. (The Visiting Professor Program is designed to assist traditionally black colleges.) Jim taught courses in numerical methods, linear programming, nonlinear programming and basic circuit analysis. Also, he worked on a number of special projects, including one to design and implement an MS degree program, marking a sig-

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nificant milestone in the efforts of the computer science faculty and College of Sciences to improve their program and meet industry's needs.

Ronald Jones, his brother-in-law and brother have helped his father, Joseph, build an electric car from a fiberglass replica of a 1952 MG that comes in a kit form. The car, built on a 1968 VW chassis, weighs 2,660 pounds and can go from 0 to 30 miles an hour in eight seconds. At an average driving speed of 40 miles an hour, it can go 65 miles before the batteries have to be recharged. Reportedly, the Jones car has a light hum as it travels along the highways in West Hartford, CT.

Mahendra Patel has been elected vice president of the Engineering Societies of New England (ESNE). A former ESNE treasurer, he is also a professional engineer and a senior mechanical engineer in the engineering, planning and research department of the Boston Edison Company. He has been associated with fossil-fueled power plants since 1969 and has been involved with air pollution studies and environmental regulations. He is currently the project manager for a $20-million Boston Service Center facility under construction in Dorchester.

V. J. Shah continues as principal engineer at Gilbert/Commonwealth in Jackson, MI.

Thomas Starr has been elected chairman of the 800-member Boston section of the American Institute of Chemical Engineers. He has an MBA from Rutgers and is currently supervisor of process engineering for Koch Process Systems, Inc., Westboro, MA. Starr, his wife, Susan, son, Michael, and daughter, Betsy, live in Southboro.

1970

MARRIED: Robert D. Plante to Jean K. Hostetler recently in Lafayette, IN. She graduated from St. Francis Hospital School of Radiological Technology, Lynwood, CA. An assistant professor of management at Purdue University, he has a doctorate in business administration from the University of Georgia.

In May, **Alan Hassett** was inducted into Beta Gamma Sigma at Southern Illinois University, Edwardsville. Beta Gamma Sigma is the national scholastic honor society in business and administration.

1971

MARRIED: James Crittenden to Lizabeth Ann Sanford in Nashua, NH, on May 29, 1982. She graduated from Rivier College and is a quality assurance specialist. He is a senior project engineer at U.S. Catheter and Instruments, Billerica, MA.

Joe Laptewicz has been promoted to assistant director of finance and technology management for Howmedica Corporate R&D, a subsidiary of Pfizer. "Fourteen-month-old son Nicholas loves sailing just like his folks." The family sails a Ranger in local regattas.

Vincent Pace received his JD degree from Temple University last May. He is now a patent attorney with the Dept. of the Navy at the Naval Research Laboratories in Washington, DC.

Have You Seen This Man?

Fun with Dick and Jane and Pete and Tillie

The next time you settle down for an evening of TV and suddenly think you've spotted a familiar face on the screen, you probably have. The face could well belong to Robert Lussier, '56, who during the past 25 years has appeared in dozens of TV shows and more than 200 commercials.

If you thought you'd caught him in the movies, that would be true, too. There have been 16 movies, as well as numerous stock productions and off-Broadway plays.

Some of Bob's latest television credits are *The Gambler, Herbie, Hart to Hart* and *The Dukes of Hazzard.* He also appeared in *Salem's Lot, The Sam Sheppard Murder Case* and *Sandcastles.* His TV specials include *Cricket on the Hearth, Hellzapoppin, Pinocchio* and *Jack and the Beanstalk.* He worked in the pilots of *Housecalls* and *The Practice.*

Among his feature films are *Love at First Bite, High Anxiety, Fun With Dick and Jane, Mother, Jugs and Speed, Airport '75, Pete and Tillie* and *The Killing of Sister George.*

Bob did a hitch in the Navy after attending WPI and Brown. A pianist, singer and nightclub performer since age 12, he later studied classical music, and, as a member of the Peloquin Chorale, taped several network TV specials.

He says, "I began my acting career in community theatre. One of my early tours was with the national company of *The Odd Couple* with George Gobel." His first work in Los Angeles was in *That Girl.* Later he appeared in TV oldies: *Get Smart, Bonanza, Owen Marshall* and *Room 222.*

Bob serves as musical director for his parish in Hollywood and has conducted an acting workshop at a penitentiary. He was affiliated with the Los Angeles Repertory Company and for ten years he has been with Theatre East, serving on the board of directors for two years. "I need constant involvement in theatre," he says.

1972

MARRIED: David Cummings and Lisa Andrews on May 29, 1982, in Holden, MA. A graduate of Nashoba Regional High School, she is a secretary for Lawrence McCoy Lumber Company, Worcester. He is executive vice president and treasurer at Worcester-based Lowell Corp. and has a master's degree from Babson.

BORN: to Mr. and Mrs. **Vincent Colonero** a son, Gregory, recently. Daughter Katie is two. Colonero is with Northeast Utilities Service Co. in Wethersfield, CT. . . .to Mr. and Mrs. **Samuel T. Cuscovitch** a daughter, Jennifer Rose, last year. Cuscovitch is assistant director of telecommunications at Cigna-Connecticut General. . . .to Mr. and Mrs. **Richard Podolny** a daughter, Seiene Deua. Podolny is a certified Rolfer in Tokyo, Japan.

Dr. **Charles Brine** has gained international recognition through publications and commercialized patents concerned with chitin, a cellulose-related marine biopolymer. He has participated in several national and international symposia and was recently promoted to manager of exploratory research for FMC Corporation in the Food & Pharmaceutical Products Division, Princeton, NJ.

John Burke is with the Department of Interior in the Bureau of Reclamation in Nevada. He says, "We live in Boulder City, about ½ hour from Las Vegas."

Michael Corby, manager of EDP consulting, Arthur Young & Co., had an article published in the *Massachusetts CPA Review* last summer. He and his wife, Linda, conduct "engaged encounter weekends for couples" in the Worcester area.

Michael DiBenedetto, an energy supply engineer for Eastern Utilities Associates (EUA), spoke about "The Future Energy Sources for EUA" at a Rotary Club meeting in Forestdale, RI, in September.

Richard Sojka has been appointed director of engineering at Clairol's manufacturing facility in Stamford, CT. Since joining the firm in 1972, he has held increasingly responsible posts including, most recently, manager of industrial engineering.

1973

Reunion October 15, 1983

MARRIED: Robert C. Haywood and Marnie Fournier on August 22, 1982, in Wakefield, RI.

She graduated from Mount Holyoke College and is a speech pathologist at Tiny Tim Developmental Center, Longmont, CO. He has an MBA from Harvard and holds the post of president at Aspen International, Inc., Boulder, CO. . . . **Herbert Hedberg** to Cynthia Hjerpe in Norton, MA, on June 26, 1982. Graduated from Wheaton College and with master's and doctoral degrees from Brown University, she is chairman of foreign languages for the Franklin public school system. An operations manager at Autochrom, Inc., Hopedale, he has a master's degree from Northeastern University. . . . **Bill C. Penney** and Noirin C. O'Brien in Worcester on July 11, 1982. Educated in Ireland, she is a beauty consultant, and an employee of the Shawmut Worcester County Bank. He is an assistant professor of biomedical engineering at WPI, where he received his master's and doctoral degrees. He is also a research associate in the department of surgery at the University of Massachusetts Medical Center, Worcester. The couple will use the last name of O'Brien-Penney.

BORN: to Rhonda and **Raymond F. Cherenzia** a son, Sergio Francis, on June 17, 1982. Ray, who is a professional engineer, has his own land surveying and consulting engineering business in Westerly, RI. . . . to Janice and **Mark Whitley** a son, Matthew Ryan, on April 17, 1982. Formerly with Shell Offshore, Inc., New Orleans, LA, Mark recently joined Mitchell Energy Corporation, The Woodlands, TX, where he is a staff reservoir engineer in the engineering and evaluations department.

Jeff Blaisdell is a project manager at Geo. B.H. Macomber Co., Boston. He and Carol have two children and live in East Falmouth.

Roger Heinen, Jr., is coauthor of *Engineering a Compiler: VAX-11 Code Generation and Optimization,* a book on computer language compiler development. It is available through the Digital Press.

John Manzo now holds the post of corporate manager at Digital Equipment Corp., Maynard, MA. He has an MBA from Southern Illinois University.

Martin Sklar holds the post of product development engineer at Foxboro Analytical, Burlington, MA.

John Williams, Jr., is a senior engineer for Shell Oil Co., Norco, LA. He says, "I am currently working in process computer control."

1974

MARRIED: Steve Dacri to Marlene Ciroli in Framingham, MA, on August 20, 1982. She graduated from Mt. Ida Junior College and has been working as a medical assistant. He is a professional actor-magician in Los Angeles. . . .**David A. Peterson** and Virginia A. Tubbs on August 28, 1982, in Ithaca, NY. She graduated from Houghton College. He has a master's degree from Cornell and is a software engineer for Borg-Warner Electronics. . . . **Stephen Remen** and Patricia Flaherty in Attleboro Falls, MA, on July 24, 1982. A sales administrator for Semi-Conductor Circuits, Windham, NH, she graduated from Westfield (MA) State College. He is a project engineer for Thermo Electron, Waltham. . . . **Craig W. Tyler** to Lois A. Brumbaugh on October 9, 1982, in Wallingford, CT. A secretary, she graduated from Stone School of Business. He is a sales engineer for Times Fiber Communications, Wallingford.

BORN: to Betsy and **John Chipman** their second child, Scott Douglas, on June 3, 1982. They have a daughter, Julie Ellen, two. John is an electrical engineer at GTE Sylvania in Westboro, MA. . . .to Marian (Compagnone) and **Irvin S. Press** their first child, Stephen Anthony, on April 12, 1982. Irv is working as an account executive at the advertising agency of Robinson Associates in Boston.

Barbara Bain has been promoted to the new post of division manager-planning and creative resources in the public relations department of Southern New England Telephone (SNET). Barbara joined the company in 1974 as a staff assistant. Later, she became senior engineer of systems planning and manager-installation and repair. Last year, she was promoted to district staff manager of business service center methods. She belongs to the Black Management Association and the Executive Women's Council at SNET.

Leonard Brzozowski holds the position of business unit manager at Midland-Ross, Toledo, OH. He has an ME from Thayer School of Engineering and an MBA from Tuck School, Dartmouth College.

Alan Judd was recently promoted to plant engineer of a division of Aqua Chem, Inc., Lebanon, PA.

Alan Kirby continues as distributed systems advanced development manager at Digital Equipment Corp., Tewksbury, MA. The Kirbys live in Tyngsboro with their baby son, Nicholas, and daughter, Sarah.

Joseph Mullin has been appointed district sales manager for the Northeast region of the Harris Corp., RF Communications Division. He will serve 11 states, including New Jersey. Mullin has eight years of experience with the U.S. Army Corps of Engineers, New England Division, and the European Division in Frankfurt, Germany. He has an MBA from the Boston University Graduate School of Management.

Douglas Schmidt, who received a degree from Palmer College of Chiropractic last year, is self-employed at Lake Boone Chiropractic in Raleigh, NC.

Charles Waldron continues as vice president and actuary at Shenandoah Life Insurance Co., Roanoke, VA.

Mark Whitney recently received his professional engineer's license in Connecticut.

1975

MARRIED: Armand A. Balasco, Jr., and Barbara A. Kuryk in Providence, RI, on June 27, 1982. She holds bachelor's and master's degrees in chemical engineering from Columbia University. He has an MS in chemical engineering from Tufts. Both are engineering consultants at Arthur D. Little, Inc., Cambridge, MA. . . . **John P. Bird** to Melissa L. Spinney on September 25, 1982, in West Brookfield, MA. A registered nurse at the University of Massachusetts Medical Center, Worcester, she graduated from Children's Hospital School of Nursing, Boston, Curry College and Fitchburg State College. He is a manufacturing engineer with Norton Co., Worcester.

MARRIED: Steven K. Eichinger and Claudia B. Barna in Somerville, MA, on June 19, 1982. She attended Douglass College and Rutgers University and is with Bell Laboratories in Murray Hill. He is a registered plant engineer at Bell Labs and holds a degree from the Polytechnic Institute of New York. . . . **Clarke V. Greene** to Virginia A. McGivern in Avon, CT, on June 19, 1982. A music teacher, she graduated from Hartt College of Music at the University of Hartford. He is a systems engineer for Times Fiber Communications.

Glenn Ekwall, now process coordinator for UOP, Inc., Des Plaines, IL, writes: "Have returned to our home office after five years on the road as a technical advisor." He and his wife, Della, have a year-old son, Justin, and live in Palatine.

Now that **John** and **Ginny Giordano Fitz-Patrick** have returned to their home in Morristown, NJ, following two years in England, Ginny is working part time as a supplemental consultant for Service Bureau Company, Greenwich, CT. John continues with Exxon Research & Engineering, Florham Park, NJ, where he is a group head. He is also working for his MBA at Rutgers. The FitzPatricks have a daughter and a son.

Abdul Khan joined Chas. T. Main International in January of 1982. He has been working on the Shiroro hydroelectric project in Nigeria.

Stephen Mealy has been named senior mechanical engineer at Neil Brown Instrument Systems, Inc., Cataumet, MA. Previously, he had been three years at Benthos, Inc., North Falmouth. In his new post, he will be working on underwater-instrument packaging.

Kevin Mischler, transportation planner for the Central Connecticut Valley Regional Planning Agency, Bristol, CT, was recently appointed transit planner (brokerage and administration) for the Windham Region Transit District. He is also associated with the Windham Regional Planning Association, where the brokerage operation is centered. He holds an MBA from the University of Hartford.

Judith Nitsch has joined Allen & Demurjian, Inc., Boston, where she is a senior project engineer. A registered professional engineer in Massachusetts, Rhode Island, Connecticut and Vermont, she had been with Schofield Bros.-Freeman Engineering Co., Attleboro, MA. She has specialized in site planning and development.

1976

MARRIED: David W. Graham and Donna M. O'Brien in Worcester on July 4, 1982. A teacher at Blackstone Valley Regional Vocational High School, Upton, MA, she graduated from Anna Maria with a BA in mathematics and is studying for her master's degree at Framingham State College. He holds the position of production supervisor analyst at Fitchburg Gas and Electric Co. In 1981, he was named an Outstanding Young Man of America. . . . **Paul A. Knollmeyer** and Tina M. Simonetta in Lanesboro, MA, on July 17, 1982. She graduated from Adelphi University with a degree in dance and is a musical comedy performer in East Windsor, CT. He is machine shop manager and engineer at Steinerfilm, Inc., Williamstown. . . . **Ivo Slezak** to Faith L. Vincent in Fulton, NY,

on August 28, 1982. She graduated from G. Ray Bodley High School. He is a service engineer for Riley Stoker, Worcester.

BORN: to Maureen and **Richard Escolas** their third child, Michael Thomas, on June 28, 1982. . . . to **Mary Polanik Sherman** and her husband, Reggie, their first child, a daughter, Alison Hayley, on August 2, 1982. Mary is on leave from Riley Stoker Corp., Worcester, where she works as a programmer/analyst.

John Bucci has accepted a post as manager of shop operations with the carboloy branch of GE in Detroit.

Hugo Cuevas-Mohr is now working on a regional development plan for the Colombian Pacific Coast, a project co-sponsored by UNICEF, the Universidad del Valle, Cali and the Colombian government. The coast is one of Colombia's most deprived areas. Previously, he studied rural development at the Catholic University of Louvain in Belgium, worked for a nonprofit foundation called "Homes for Farm Youth" and served as a technical manager for a shrimp fishing company off the Colombian coast.

Jim Hall, who serves as a senior consultant for Arthur Andersen and Co., is now president of the Boston Chapter of the WPI Alumni Association.

Kevin Hastings has been promoted to supervisor of betterment construction at Northeast Utilities (NU), Hartford, CT. He was promoted to engineer in betterment construction in 1981. He has an MS in management from Hartford Graduate Center. Hastings is married and lives in Colchester, where he participates in athletic activities and recreational programs.

Philip Sherwood wrote an article about bis cyclic urea compounds which appeared in the June issue of the *Journal of Coatings Technology*. He specializes in the development of coating systems at the Donald S. Gilmore Laboratories of the Upjohn Co., North Haven, CT.

Jeffrey Wilcox holds the post of area sales manager at Mobil Oil Corp., Los Angeles. He received his MBA from the University of Pittsburgh.

1977

MARRIED: Matthew L. Bacon and Jean M. Fritz in Erie, PA, on June 12, 1982. She has a BS in nursing and is a registered nurse in the cardiac-care unit at St. Vincent Health Center, Erie. He serves as plant manager at Erie Tool Works. . . . **Douglas B. Christensen** and Kathleen Szczoczarz in Seekonk, MA, on September 25, 1982. She graduated from Tolman High School and is employed by Old Colony-Newport National Bank, Providence, RI. He is with Texas Instruments, Attleboro, MA. He has an MBA from Bryant College. . . . **Lawrence N. Coel** to Gail L. Soll in Natick, MA, on September 5, 1982. She received a bachelor's degree in business management from Boston University. A sales administrator at Interex Corp., Natick, he has an MBA from the University of Hartford. . . . **John W. Hjort** and Margaret K. Billing on June 19, 1982, in Stowe, VT. She attended George Mason University and was a student at Trinity College. She is a staff assistant at IBM in Essex Junction, where he serves as an associate engineer.

MARRIED: Dr. **Steven Hoogasian** and Julia A. Boytim on June 12, 1982, in Spencer, MA. She is a student at St. Francis Hospital School of Nursing, Hartford, CT. A graduate of Worcester State College and Albany (NY) Medical College, he is a surgical resident at St. Francis Hospital. He has a PhD in chemistry from WPI. . . . **Walter Peterson** and Debra Foley in Plainville, MA, on August 14, 1982. She graduated from Bridgewater State College and is a special education teacher. He serves as a structural engineer for ITT Grinnell. . . . Dr. **Martin P. Wai** to Lei Yu in Shrewsbury, MA, on June 6, 1982. She graduated from National Taiwan University and is studying for her master's degree at UMass, Amherst. Dr. Wai, who received his PhD from the University of Massachusetts, is with Hercules, Inc., Wilmington, DE.

Michael Connor works as a construction engineer at EBASCO Services, Inc., Jensen Beach, FL. Since graduation he has been employed with the St. Lucie Unit 2 nuclear power plant.

Paul Hajec, who is employed by the Merrimack Valley Planning Commission (MVPC), Haverhill, MA, has a master's degree in transportation engineering from Northeastern. He also serves as the MVPC liaison to Georgetown's Board of Selectmen and Urban Systems Committee.

Mark Johnson, who received his MD from the University of Massachusetts in 1980, is a senior resident at Brigham and Women's Hospital, Boston, MA.

Ronald Jolda was among the first group of students who graduated from the University of New England College of Osteopathic Medicine in Biddeford, ME, in June. He is interning at Lansing General Osteopathic Hospital in Michigan.

Steven Kovner is a programmer for Higher Order Software, Department of Transportation, Transportation Systems Center, Cambridge, MA. His wife, Marcia, received her master's in chemistry from Brandeis. They have one child.

Catherine Seymour, who recently received a PhD in chemistry from MIT, has been named a postdoctoral research scientist at the Worcester Foundation for Experimental Biology in Shrewsbury, MA.

Christin Walker has received her MSME from RPI, graduating with honors. She has been attending RPI while working as an engineer at GE in Pittsfield. Recently, she graduated from GE's Advanced Training Program.

Matthew Ward is with the MTS-Visual Communications Research Department at Bell Labs in Holmdel, NJ. He has an MS and a PhD in computer science from the University of Connecticut.

George Whitwell has received his PhD from Cornell. He is an associate research chemist at Stauffer Chemical Co., Dobbs Ferry, NY.

1978

Reunion **October 15, 1983**

MARRIED: Karen A. Chesney to Frederick J. Honold, Jr., on October 9, 1982, in Morristown, NJ. She is a staff manager with the American Telephone and Telegraph Company in Parsippany, NJ, where he is a staff supervisor with AT&T Long Lines. He graduated from Bowdoin College and received an MBA from Seton Hall University. . . . **Peter W. Landry** and Susan M. Lapierre on June 4, 1982, in Leicester, MA. She graduated from Boston College. He is with Exxon Research & Engineering Co., Florham Park, NJ. . . . **Houghton Lewis** and Joanna S. du Pont in Greenville, DE, on September 18, 1982. She graduated from Brown University and until recently was with the New York advertising agency of Grey, Lyon & King. He is technical representative for the photo products division of E. I. du Pont de Nemours & Company in Lansing, MI. . . . **Thomas J. Medrek** to Kathleen A. O'Brien in Franklin, MA, on August 28, 1982. She graduated from Becker and the University of Connecticut with degrees in physical therapy. He is a candidate for a master's degree at Dartmouth College. . . . **Doreen R. Woodman** and John W. Taylor, Jr., on October 2, 1982, in Worcester. She is employed by Raytheon Equipment Division, Wayland, MA. He graduated from Boston College and Suffolk University and is with GTE Communication Systems, Needham.

Michael Ahern has been promoted to engineer at Northeast Utilities, Hartford, CT. He joined the firm in 1981 as an associate engineer in the Generation Engineering Department at the Berlin general offices. He has a master's degree in engineering mechanics from the Hartford Graduate Center and is working toward his MBA at the center. From 1978 to 1981 he was with Pratt & Whitney Aircraft.

Zita Babickas, a scientist for Energy Resources Co., Inc. (ERCO), Cambridge, MA, has an MS in biochemistry from the University of Rochester.

Lou Collette, an engineering specialist at Emerson Electric in St. Louis, MO, is studying for his master's at the University of Missouri.

Patrick Donahue serves as liaison engineer for Du Pont in Newark, DE. He is working on a project team to rebuild nuclear chemical separations plants at Savannah River, SC.

Robert Naugler has received his MSME from Northeastern. He is with Raytheon of Wayland, MA.

Rob Pierce serves an assistant project engineer at Eastern Utilities Associates, Lincoln, RI. He also works as a flight instructor at Skylanes, Inc., North Central State Airport.

Dr. **Steven Sepe,** who graduated from the New York University College of Dentistry in New York City in 1982, is currently a dentist with the Billerica (MA) Dental Association.

1979

MARRIED: Scott M. Booth to Paula R. Labrum on June 12, 1982, in Avalon, NJ. She attended Delaware County College. He is project manager for Mellon-Stuart Co., Harrisburg, PA. . . . **Albert A. Cormier** and **Diane R. McConnell** July 31, 1982, in Pawtucket, RI. She is with New England Telephone, Framingham, MA , and he is with Kemper Group in North Quincy. . . . **Stephen Fisk** to Jane Bartlett in Worthington, MA, on August 7, 1982. She graduated from Gateway Regional High School and is with the cardiology department at the Cooley Dickinson Hospital.

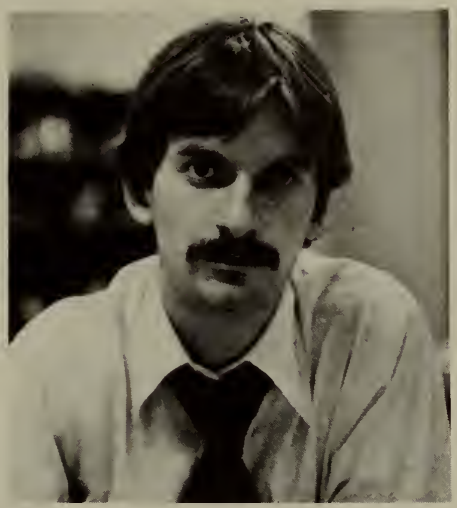
Paul Cleary Wins Writing Awards

Paul Cleary, '71, an editorial writer for the *Tulsa World,* has received two awards in the Associated Press newswriting competition for Oklahoma. He won first place for newspaper column writing and second place for public service reporting.

The columns included analyses of U.S. House Budget Committee Chairman James Jones's battle over the Reagan administration's budget proposal, the campaign by the National Conservative Political Action Committee to unseat Jones, and the constitutionality of executing juvenile criminals.

With the *World* for five years, Cleary placed second in public-service reporting for an article on loopholes in the state's drunken-driving laws. The story led to an overhaul of the Oklahoma statutes.

After graduating from WPI with a degree in Humanities and Technology (English), Cleary served as a regional reporter for the *Worcester Telegram & Gazette* in Clinton, Southbridge and Webster, MA, and as a member of the city news staff. Later, he was a visiting professor in English and an associate project administrator at WPI. He also served on the WPI Student Alumni Relations Committee. He holds a law degree from the University of Tulsa and is a member of the Oklahoma bar.



His articles mold public opinion.

Cleary joined the *Tulsa World* as a reporter while attending the University of Tulsa. After receiving his degree, he became political editor until named editorial writer in July 1981. His wife, Julia Ann, also a writer, graduated from the University of Missouri Journalism School.

He works for Daniel O'Connell's Sons as a field engineer and mechanical coordinator in Holyoke. . . . **Robert R. Lamoureux, Jr.,** to Alisa F. Iadevaia on July 17, 1982, in Warwick, RI. She attends Rhode Island College. Cormier is employed by Gulton Industries. . . . **David A. Mauriello** to Susan A. Fusco in Watertown, CT, on July 30, 1982. A teacher in Melbourne, FL, she graduated from UConn and the Computer Processing Institute, East Hartford, CT. He is employed as a product engineer by Harris Semiconductor, Inc., in Palm Bay, FL.

MARRIED: Peter Mullarkey and Sara J. Horton in Lancaster, NH, on July 10, 1982. She graduated from UNH. He attends graduate school at Carnegie-Mellon University, Pittsburgh, PA. . . . **Rene J. Richard** to Diana M. Murphy in Rochester, NY, on September 18, 1982. She graduated from Bryant & Stratton and is a secretary at Eastman Kodak Co., Rochester, where he is a mechanical engineer. . . . **John M. Tracy, Jr.,** and **Joanne Beckett** on September 5, 1982, in Worcester. She is a research engineer for Union Carbide Corp., Tarrytown, NY. She has a master's degree from WPI. He has a master's from Northeastern and holds the post of terminal supervisor at Exxon Corp., Pelham, NY. . . . **Chris Wilmot** and Adelaide Auwerda in Sparta, NJ, on July 24, 1982. She attended Becker and graduated from Trenton State College with a nursing degree. He is a chemical engineer with the Naval Ordnance Station in Indian Head, MD.

BORN: to Mary and **Jeffrey Boike** a son, Justin Richard, on August 3, 1982. Jeff continues with UOP in McCook, IL.

John Auger recently moved to Connecticut after being promoted to senior manufacturing engineer at Parker-Hannifin. He and his wife, Sarah, reside in Middletown.

Mary Farren holds the post of manufacturing engineer at IBM, Poughkeepsie, NY.

Dorothy Hamilton, who is working for her PhD at the University of Illinois, is a research assistant in chemistry at the University of Florida in Gainesville.

Stephen Hull, Jr., is an NIH doctoral fellow at Michigan State University in East Lansing.

Edward Lambert, Jr., wrote a section in the mechanical engineers' *Blue Book,* "Internal Grinding—Advantages, Problems and Solutions." He is supervisor of grinding applications at Heald Machine division of Cincinnati Milacron, Worcester. He has a degree from Northeastern University, as well as from WPI.

Henry Lapa is a maintenance-material control officer for the U.S. Navy at the Naval Air Station in Fallon, NV.

Donald Larson is a first-year graduate student in Philadelphia at the Wharton School, University of Pennsylvania.

Alfred Marotta is an associate electrical engineer at Aydin Computer Systems, Ft. Washington, PA. He joined the company in April.

Bharvi Parikh is with IBM in Endicott, NY. He has an MSEE from WPI.

Richard Sewersky serves as an industrial engineer at Sikorsky Aircraft, Stratford, CT.

Ray Weavill is employed as an industrial engineer in AMP Inc.'s Machine Products Division, Harrisburg, PA.

Priscilla Young, a project engineer for Mobil Oil Corporation, lives in Inwood, NY.

1980

MARRIED: Stephen E. de Laszlo to Heather J. Jones in Southboro MA, on July 31, 1982. She graduated from the school of nursing at the University of Massachusetts. He is pursuing his doctorate in chemistry at Brown University. . . . **David A. Gura** to Janet L. Kuerzi recently in Harrington Park, NJ. She graduated from Bergen Community College. He is with Schlumberger Well Services in Corpus Christi, TX. . . . **Gilbert E. Martin, Jr.,** and **Candace Buckley** on June 19, 1982, in Braintree, MA. They are both with Stone & Webster, Boston. . . . **Richard J. Preliasco** to Christine Peterson in Gardner, MA, on June 6, 1982. She has a BS in biology from Fitchburg State College. He holds the post of mechanical design engineer at Lockheed, Mountain View, CA. . . . **Peter W. Westcott** and Mary P. Ross recently in Norwood, MA. A secretary, she graduated from Worcester State College. He is an electrical engineer.

Michael Boulanger, who has completed the manufacturing management program at GE, is now a manufacturing engineer for the firm in Wilmington, MA. He and his wife, Susan, have two children and live in Londonderry, NH.

Robert Cummings has accepted the post of engineer at Firepro Incorporated in Wellesley Hills, MA. He will assist senior firm members in both fire defense programming for new facilities and assembling facts in the autopsy of major fire incidents. Previously, Cummings was systems engineer at Fenwal Incorporated, Ashland, MA. An associate member of the Society of Fire Protection Engineers, he is working for his MS degree in fire protection engineering at WPI's Center for Firesafety Studies. His wife, **Candyce Hallock Cummings,** is a first lieutenant in the U.S. Air Force at Hanscom Field.

James Drumm has received a graduate assistanceship at Clemson University in South Carolina, where he is studying for his MS in chemical engineering.

John Hoyte, who is working for his doctorate in electrical engineering and computer science at MIT, was featured in an article about graduate school in the October issue of *The Black Collegian.*

Scott Mease works as a civil engineer for Daniel Construction on the VEPCO Project in Warm Springs, VA.

Cathy Reed is now a physicist for Sanders Assoc., Inc., Nashua, NH.

Charles Richards is a research assistant at the University of Virginia in Charlottesville.

Angelo Scangas has been promoted to maintenance supervisor at National Starch and Chemical Corporation's Plainfield, NJ, facility. He started work at the company in 1980 and most recently was a project engineer. He belongs to the American Institute of Plant Engineers and the ACS and is an associate member of the American Institute of Chemical Engineers.

1981

MARRIED: Raymond G. Aubert and Valerie A. Schenato on May 29, 1982, in Torrington, CT. She graduated from Torrington High School. He works as an application engineer

at the Torrington Co. . . . **Timothy F. Daley** to Patricia A. Gouin in Worcester on July 10, 1982. She has a BA in social services degree and an MA in rehabilitation counseling, both from Assumption College. Daley is a field engineer for the Dresser Atlas Oilfield Services Group, Graham, TX. . . . **Richard J. Laflamme** and Pamela Madden in Manchester, NH, on July 31, 1982. She attended Concord Hospital School of Nursing. He is a manufacturing engineer with the Vectrol Division of Westinghouse Electric Corp. in Tampa, FL. . . . **Charles Mendes** to Jo-Anne M. Souza on June 26, 1982, in North Dartmouth, MA. A medical secretary, she attends Becker Junior College. He has been studying for his master's degree at WPI and is an insulation engineer for GE in Lynn, MA.

MARRIED: William J. Norwood, III, and **Susan J. Rys, '82,** on June 5, 1982, in Taftville, CT. He serves as a design engineer for Chevron in Richmond, CA. . . . **Richard Rempe** and Cheryl Allyn on August 14, 1982, in West Hartford, CT. She graduated from Becker. He is with Exxon Corp. in Houston. . . . **Roland P. Roberge** and Elaine F. Ritter in Shrewsbury, MA, on July 10, 1982. She graduated from Framingham State College and Canisius College and has been teaching at Austine School for the Deaf, Brattleboro, VT. He is with GE in Waltham, MA. . . . **Michael R. Teague** to Alyson R. Budeit in Orange, CT, on August 28, 1982. She graduated from Becker and is travel manager of Race Brook Travels. He is a process supervisor at Pfizer Inc., Groton, CT.

Gary Almeraris, who received his MS from WPI, holds the post of construction superintendent at MacLean Grove & Co., Inc., Greenwich, CT.

Tim Gottlieb has accepted a post as staff engineer with McGough and Gottlieb in Liberty, NY. He had been a field engineer for Schlumberger Well Services in Laredo, TX.

Francis Polito, who has been with Bell Laboratories, North Andover, MA, since December of 1981, is studying for his MSEE as a participant in Bell Labs OYOC Program at Cornell University.

Elliott Rothchild is employed by Analogic Corp., Wakefield, MA.

Fred Rucker serves as engineering manager at AT&T Long Lines, White Plains, NY.

Air Products and Chemicals, Inc., has appointed **Charles Wilder** Southwest regional sales representative for their industrial chemicals division in Houston, TX. In his new post, he will have sales responsibility for the entire line of industrial chemicals division products. With the firm since 1981, Wilder had been sales administrator in the industrial chemicals division.

1982

MARRIED: Gary Bisson and Barbara A. Garvey in Worcester on July 10, 1982. She attended Assumption College and he is a mechanical engineer with Kodak in Rochester, NY. . . . **Deborah A. Chichlowski** and Carl J. Gustafson on September 25, 1982, in Somerset, MA. She is an industrial engineer. He graduated from North Brookfield High School and is a mechanic. . . . **David G. Converse** and **Kimberley J. Ferris** in Worcester on June 27, 1982. He is an associate food service equipment engineer with Friendly Ice Cream Corp., Wilbraham, MA. . . . **Todd M. Dean** to **Donna M. Martin** in Spencer, MA, on August 7, 1982. She is a chemical engineer and he is an electrical engineer at Du Pont's Savannah River plant in Aiken, SC. . . . **Keith R. Gerhardt** to Deidre L. Loughlin on August 21, 1982, in Worcester. She is a student at Assumption College. He is an electrical engineer for Mitre Corp., Bedford. . . . **Richard L. Harlow** and Kathleen A. Tierney in Canton, MA. A systems analyst, she graduated from Stonehill College. He is with Foxboro Company.

MARRIED: Nils J. Jacobson and Laura K. Gallerani in Pomfret, CT, on June 13, 1982. She graduated from Anderson College and is employed at Hubbard Regional Hospital, Webster, MA. He is with MayGold Farms, Pomfret, CT. . . . **Robert S. Montagna, Jr.,** to Cheryll Ann Johnson on June 27, 1982, in Holliston, MA. She graduated from Holliston High School. He serves as a field engineer for Daniel O'Connell's Sons, Holyoke, MA. . . . **Brian D. Reedstrom** and Jill C. Lamoureux in Keene, NH, on June 19, 1982. She has a BS in nursing from St. Anselm College. He is a project engineer for Tampax, Inc., Palmer, MA. . . . **Jan O. Sorensen** and Diane P. Grever in Medford Lakes, NJ, on January 16, 1982. She graduated from Worcester School of Craft and had served as head teller at a bank in Medford Lakes. He is employed with Sorenco International in Copenhagen, Denmark.

Peter Abend is an applications engineer at Beswick Engineering, Ipswich, MA.

Lynn Beauregard has accepted a post as an associate product planner with Western Electric in Burlington, MA.

John Breen holds the post of project controller for Manufacturers Business Systems, Inc., Worcester.

John Capurso is an industrial engineer at Data General Corporation, Southboro, MA.

Stephen Carroll is now an HVAC engineer at Thompson Consultants, Inc., Marion, MA.

David Catrone has joined Teradyne in Boston.

Robert Cormier, Jr., is a research staff member in the missiles division at Analytic Services, Inc., Arlington, VA.

Dermot Daley is employed by Moisture Systems Corp., Hopkinton, MA.

John Dempsey has joined Eastman Kodak in Rochester, NY.

Robert Gambardella holds the position of professional development associate at Colt Industries-Firearms Division in West Hartford, CT.

John Kelly works as a plant services engineer for the Pfizer Chemical Division in Brooklyn, NY.

Jeffrey Kern serves as a systems designer for Singer-Kearfott in Wayne, NJ.

Joseph Mayer is a test engineer at Niagara Mohawk Power Co., Syracuse, NY.

Edward McGuire has joined the Naval Underwater Systems Center, Newport, RI, where he is a mechanical engineer.

Ann Noga is now with GTE Sylvania in Danvers, MA.

Mary Ann O'Connor has taken a post as associate software engineer at Softech, Inc., Waltham, MA.

Paul Oliveira is a construction manager for O'Brien & Gere in Syracuse, NY.

Rob Oshana has joined Texas Instruments in Dallas, where he is an electrical design engineer.

Sandy Paille is a mechanical engineer at Kollmorgen Corporation in Northampton, MA.

Robin Phillips has accepted a post as assistant civil engineer in the Los Angeles (CA) County Road Department.

Steven Schenker is a design engineer for Chevron, U.S.A., El Segundo, CA.

Maureen Seils serves as an associate engineer for processor cooling at IBM in Endicott, NY.

Robert Sinkiewicz is a field engineering representative for GE in Pittsfield, MA.

Ingrid Slembek has been named a software engineer in diagnostic engineering at Digital Equipment Corp., Marlboro, MA.

Timothy Stanley is with Digital in Maynard, MA.

Matthew Steele works for Schlumberger Well Service in Pleasonton, TX.

Gail Strzepa has been employed by the engineering department at Standard Oil of California in San Francisco.

Ann Sullivan is now with Westinghouse in Baltimore, MD.

Joel Swan serves as a programmer-analyst for Texas Instruments in Lewiston, TX.

Tim Thibodeau has been named an intern engineer in the Technical Associate Program at Emhart Corporation, Farmington, CT. He is one of three college graduates selected to launch the new intern program, designed to acquire and train outstanding engineering graduates for Emhart's divisions. While at WPI, Tim worked on robots being developed for Emhart's use under a joint project sponsored by WPI and Emhart.

John Tirrell is a designer at Stone & Webster Engineering Corp., Boston.

William Townson is employed by the Equipment Group at Texas Instruments in Dallas, TX.

Jack Traver, Jr., has joined Traver Electric Motor Co., Waterbury, CT.

Joyce Trela is a chemical engineer at Improved Laminated Metals in Providence, RI.

Edward Vahan holds the post of management information consultant at Arthur Anderson & Co., Hartford, CT.

Robert Valentine serves as a component engineer at Data General, Westboro, MA.

Joe Vignaly now works for Martin-Copeland Co., East Providence, RI.

Henry Voorhis, Jr., is employed as a manufacturing engineer at Teradyne Connection Systems in Nashua, NH.

Elizaheth Katz Wadge serves as plant engineer for Detroit Diesel Allison, a division of General Motors. She is located in Indianapolis.

Richard Welch works for Stone & Webster in Boston.

Christopher Wraight is now an account executive trainee with the Boston office of American Telephone & Telegraph.

Richard Wurm has joined New England Telephone in Brockton, MA.

Karen Zalewski is employed by Digital Equipment Corp., Maynard, MA.

School of Industrial Management

Donal Sieurin, '60, chief of engineering proposals at Morgan Construction, Worcester, has

retired and is living in East Dennis, MA. . . . **Theodore Strojny, '61,** was recently named vice president of manufacturing at Bay State Abrasives, Westboro, MA. He is responsible for grinding wheel operations in Westboro, Chester and North Manchester, IN. Formerly the operations manager, he will now head manufacturing at Anderson Operations in Worcester, a producer of power brushes, hole saws and nonwoven abrasives. Strojny attended Holy Cross and joined the company in 1950. . . . **Robert Kendrick, '65,** serves as plant manager for Bay State Abrasives in Chester, MA.

Bay State Abrasives has advanced **Andre Chambre, '72,** to manufacturing manager in Westboro. He joined the company in 1963 and was appointed production superintendent in 1978. He has an MBA from BU, is a past president of the Worcester Chapter of AIIE and has served as a councilor to the Worcester Engineering Society. . . . **Samuel Schumacher, '73,** has been named director of engineering at Russell Harrington Cutlery Co., Southbridge, MA. First with the firm in 1966, he was assigned to special assignments in the engineering department. Prior to his promotion to production manager in 1975, he had been general foreman of forging, blanking, heat treatment and the machine grinding departments for three years. Since 1980, he has worked on special assignments in engineering. He attended Boston University.

Milton Steen, '79, is now district manager of Massachusetts Electric Company's Southbridge-Palmer district. Previously, he had been manager of the Attleboro office and district manager of the Marlboro office. Steen started at Mass. Electric in 1961. In 1975, he was named assistant director of consumer services for New England Electric, the parent company of Mass. Electric. He graduated from the University of Rhode Island.

Natural Science Program

Susan Fontaine, '82, a science teacher at Marianapolis Prep School, Thompson, CT, is also the recently appointed dean of girls. She received her bachelor's degree from Eastern Connecticut State College.

COMPLETED CAREERS

Kenneth F. Burns, former crew coach at WPI, died in Worcester on August 4, 1982, at the age of 77.

One of the Worcester area's most accomplished rowing enthusiasts, Burns was instrumental in bringing the Olympic crew trials to Lake Quinsigamond in 1932 and 1952 and in making the intercollegiate Eastern Sprints regatta a regular event at the lake for many years. In 1952, he was a member of the official staff at the Olympic Games held in Helsinki.

Burns captured the New England novice championship on Boston's Charles River in 1922. He was a longtime crew coach at Shrewsbury (MA) High School, and his teams won more than eight national crowns and two New England titles. He was a former coach at St. John's High School and WPI. In 1962, he was named to the Helms Rowing Hall of Fame

For 23 years he was the chief law enforcement officer in Shrewsbury. A past president of the Massachusetts Police Chiefs' Association, he had also served as a member of the state Division of Fisheries and Game.

Burns received citations and resolutions from the Massachusetts State House of Representatives and Senate in recognition of his accomplishments in the fields of boating, hunting and conservation. A native of Chelsea, MA, he graduated from North High School in Worcester.

Henry J. Potter, '03, a former safety engineer and one of WPI's oldest living alumni, passed away on September 25, 1982, in Hyannis, MA, following a long illness. He was 101 years old.

He was born in Webster, MA, on February 22, 1881. He graduated as a mechanical engineer from WPI. He had been affiliated with the Draper Co. and the Travelers Insurance Co. From 1914 to 1949 he was with the Hartford Accident and Indemnity Co. (now the Hartford Insurance Group), from which he retired as supervising engineer.

A former member of the ASME and the American Society of Safety Engineers, he also belonged to the Masons and the Dukes County Historical Society, Edgartown. He had been a deacon in the Congregational Church and a member of the Methodist Church.

Mr. Potter served with the Connecticut State National Guard in World War I.

Millard F. Clement, '10, died in the Holyoke (MA) Soldiers' Home on September 15, 1982. He was 95.

Born on August 28, 1887, in Bethlehem, NH, in 1910 he received his BSEE from WPI and in 1912 his professional EE degree. During his career he was with the New York, New Haven & Hartford Railroad, the Pennsylvania Railroad, McGraw Hill Publishers and Chas. H. Tenney, Engineers. From 1924 until 1957, when he retired as vice president, he was employed by Orange and Rockland Utilities, Middletown, NY.

A veteran of World War I, he served aboard the USS *New York* in the North Sea and later retired as a lieutenant commander in the USNR. He obtained the 32nd degree Scottish rites as a Mason while in Scotland in World War I. He received the Silver Beaver award for his many services to Scouting. He belonged to Theta Chi, the Rotary Club and the Baptist Church. In 1978, he received the Gold Cane Award as the oldest male resident of Granby, MA.

Mr. Clement had been a member of the New York State and National Society of Professional Engineers, the American Gas Association, the American Legion and the Middletown University Club.

Cedric E. Thurston, '15, died on July 29, 1982, in Springfield, MA. He was 89.

After studying electrical engineering at WPI and MIT, Mr. Thurston was associated with the coal industry in western Pennsylvania and West Virginia from 1922 to 1959, when he retired.

He was an Army veteran of World War I, a member of ATO and a former church deacon. A native of Rumford, ME, he was born on August 22, 1892.

Oakley C. Walker, '18, formerly with Norton Co., died in St. Vincent Hospital, Worcester, on August 22, 1982, at the age of 88.

A Worcester native, he was born on June 19, 1894, and later was a student at WPI. He graduated from the University of Michigan School of Engineering.

Mr. Walker was with Norton Co., Worcester, for 47 years, retiring in 1959. He belonged to SAE and the Episcopal Church and served in the Army Air Service in World War I.

Dr. **Frederic R. Butler, '20,** professor emeritus of chemistry at WPI, died on July 15, 1982, in St. Vincent Hospital, Worcester.

Born in Worcester on May 26, 1899, he received his MS from WPI in 1922 and his PhD from Harvard in 1925. He taught at the University of Massachusetts for two years and served on the WPI faculty from 1927 until 1965. He was a former moderator of the Newman Club at WPI, as well as golf club coach.

Dr. Butler belonged to Sigma Xi, Tau Beta Pi, Phi Kappa Theta, the Tech Old-Timers and the American Chemical Society. He was a former member of the Worcester Planning Board and a past president of the Worcester Engineering Society. He had served on the Central Massachusetts Regional Planning Commission and the Comprehensive Health Planning Commission.

A member of the board of directors at the Research Foundation of St. Vincent Hospital, he was also a charter member and past president of the Worcester Chemistry Club. An avid tennis player, he belonged to the Worcester Tennis Club.

Warren A. Ellsworth, '22, retired associate treasurer and assistant secretary of the Paul Revere Life Insurance Co., died at his home in Palm Beach, FL, on October 7, 1982.

He was born in Worcester on April 30, 1901, and received his BSME from WPI. From 1924 to 1967, when he retired, he was with the Paul Revere Life Insurance Company (Mass. Protective Association, Inc.), Worcester. At the time of his retirement, he was associate treasurer and assistant secretary of the company.

Besides serving as director of his company and of the Paul Revere Variable Annuity Insurance Company, Mr. Ellsworth had been a past president of the University Club and past commander of the Worcester County Power Squadron. He was a trustee of the Worcester Natural History Society, the Hillside School of Marlboro and the Massachusetts 4-H Foundation and a past trustee of the Worcester Foundation for Experimental Biology. In 1972, he received an honorary doctorate from Assumption College.

Mr. Ellsworth was a member of the Masons, the Shrine, the Worcester Club and the Tatnuck and Worcester country clubs. He was a

former member of the President's Advisory Council at WPI. His son, **Warren A. Ellsworth, Jr.**, graduated from WPI in 1952.

Enfried T. (Larry) Larson, '22, of Worcester was killed in an automobile accident in Brookfield, VT, on July 24, while returning from a family reunion. He was 81.

Larry was born on October 8, 1900, in Worcester. After receiving his BSME from WPI, he was a sales engineer at Norton Co., Worcester, where he worked for 43 years, retiring in 1965. From 1952 to 1965, he was an editor of *Grits and Grinds*, a Norton technical publication.

Long active in WPI alumni affairs, Larry was chairman of the 60th class reunion last June and had served on the publications committee and as a former president and program chairman for the Tech Old-Timers. He belonged to Theta Chi fraternity, the Masons, Knights Templar, the American Society of Tool and Manufacturing Engineers, the Massachusetts Industrial Editors Association and the Society of Professional Engineers. He was a member of the Worcester County Mechanics Association, the Swedish Charitable Association, Trinity Lutheran Church and the Norton Co. 25-Year Club.

Stanley F. Johnson, '26, of Oakland, CA, died on July 15, 1982, following several strokes and a heart attack. He was 79 years old.

Mr. Johnson graduated as a civil engineer from WPI. He had been a consultant for Industrial Risk Insurers. During World War II, his specialty was fire safety.

After retiring 14 years ago, he went to Merritt College and the University of California, where he studied computer systems. Later he designed fire-extinguishing systems for nuclear plants and nuclear-powered vessels.

Mr. Johnson belonged to Phi Sigma Kappa, Skull, the Poly Club, the Masons, the Mayflower Society, the Sons of the American Revolution, the Massachusetts Historic and Genealogical Society and several professional engineering groups. Born in Worcester, he was related to three of the first colonial governors and to Francis Cook, who came to Massachusetts on the Mayflower.

Frank C. Taylor, '28, passed away suddenly on September 6, 1982, in Camden, NJ.

A native of West Springfield, MA, he was born on November 27, 1904. He graduated as an electrical engineer and was with Mutual Benefit Life Insurance Co., Newark, for 26 years before retiring in 1976 as assistant secretary-treasurer.

Mr. Taylor was a past president and trustee of the West Essex First Aid Squad and a member of the Mortgage Bankers Association of Newark and Phi Sigma Kappa.

Ellman R. Smith, '30, a longtime manager of Union Mills Paper Manufacturing Co., died in Hyannis, MA, on August 8, 1982.

A native of Norwood, MA, he was born on October 5, 1907. Graduating as a mechanical engineer, he belonged to Theta Chi. From 1933 to 1941, he was with Hollingsworth & Vose Co. He joined Union Mills of New Hope, PA, in 1941, staying with the firm until he retired in 1970.

He had served as a member of his local board of education, as a past master of a Masonic lodge and as an elder of the Presbyterian Church. Later, he was a member of the administrative board, finance committee and choir of the Eastham United Methodist Church.

He belonged to the Technical Association of the Pulp and Paper Industry and to the Paper Industry Management Association.

Allan F. Hardy, Jr., '35, class vice president and a retired vice president and director of Norton Co., Worcester, died on July 19, 1982, at his home in Chatham, MA, at the age of 69.

In 1935, Mr. Hardy began his career at Norton in the manufacturing control department. Later, after serving as plants engineer, he was named general manager of the Norton Refractories Division in 1961. He was elected vice president in 1962 and director of Norton Co. in 1963. In 1965, he became executive vice president and director of National Research Corp., Newton, a Norton subsidiary. Subsequently, he was named president.

Associated with the Guardian National Inspection and Warantee Corp. of Orleans, Mr. Hardy, a professional engineer, was also an executive vice president of the San-Vel Concrete Co. of Littleton from 1972 to 1975. He had been president of Hardy Contractors of Princeton and of Allan Hardy Assoc., Weston.

He received his BS in chemistry and then did postgraduate work at the Harvard Graduate School of Business and the University of Iowa. He belonged to Theta Chi and the Congregational Church.

Mr. Hardy was active in WPI affairs, serving as a former vice president of the Alumni Association, as an Alumni Council representative from Worcester, as a Fund Board member and as vice president of the WPI Executive Committee.

A Worcester native, he had held leadership roles with Norton Machines, Ltd., the Massachusetts Taxpayers Association, Holden District Hospital, Worcester Community Chest, the Kiwanis Club, the Red Cross and the Greater Boston Chamber of Commerce. He and his wife co-founded the New-Comers of Chatham.

John J. Molloy, '35, died of cancer on August 13, 1982, at his home in Tucson, AZ. He was born in Worcester on January 27, 1915.

A graduate civil engineer, he retired in December 1973 after 37 years with the U.S. Geological Survey. His career with the agency took him to several states, culminating with a post as district chief of the Columbus, OH, office.

During World War II, he was a U.S. Army officer stationed in the South Pacific; he retired as a colonel in the U.S. Army Reserve in 1968.

A longtime member of the ASCE, he was a former president for two different sections. John also belonged to the New York State Society of Professional Engineers, the American Legion and Phi Kappa Theta.

George H. Perry, '35, a former manager of finance for Warner & Swasey Co., Grinding Machine Division, Worcester, died in Cape Cod Regency Nursing Home, Centerville, MA, on September 12, 1982. He was 69.

He graduated from WPI's School of Industrial Management in 1956 and also graduated from Harvard University School of Industrial Management and New England School of Accounting. From 1935 to 1941 he worked for the City of Worcester. In 1941 he joined Norton Co., where he served as a supervisor. He was named manager of finance for Warner & Swasey Co., Grinding Machine Division in 1972.

Mr. Perry was a master sergeant in the Army Corps of Engineers in World War II. He was a past director of the New England Chapter of the National Association of Accountants and a past president, vice president and treasurer of the association's Worcester chapter. He had been district director of the New England District Collie Club of America, Inc., president of the Associated Collie Club of Northeastern United States, president of Wachusett Kennel Club, Inc., a licensed judge for the American Kennel Club and a member of Cape Cod Kennel Club. He belonged to the Congregational Church and SAE.

Roy O. Swenson, '35, a retired senior engineer from Norton Co., Worcester, died on July 31, 1982, at his home in Holden, MA.

He was born on August 31, 1912, in Worcester. Graduated as a mechanical engineer, during his career he was with Alden Hydraulic Laboratory and Cragin & Wilkins. Formerly he owned and operated Swenson Engineering. He was with Norton Co. for 40 years.

Mr. Swenson belonged to ATO, the Poly Club and the Tech Old-Timers, as well as the Worcester Chemists Club, the Masons, the Eastern Star, the Commandery and the Massachusetts Society of Professional Engineers. He was an avid sportsman and had traveled throughout South Africa on safari, as well as on Norton Co. business. He had also toured Scandinavia.

Frederick A. Anderson, '42, a professor of mechanical engineering at WPI for many years, died in Worcester on October 11, 1982.

He graduated as a mechanical engineer and was appointed an instructor at WPI, beginning a 40-year teaching career. In 1953, he received his MSME and in 1963 he was appointed a full professor. In 1974, he taught for a term at the City University of London under WPI's exchange program with that university.

In 1956, Professor Anderson became the first coordinator of the Evening Graduate Study Program, a post he held until he served on the faculty of the U.S. Naval Academy during a leave of absence in 1959 and 1960. He did summer work at Cornell, Purdue, the University of Colorado, Stanford, MIT and Northeastern.

A native of Worcester, he was born on March 3, 1920. He belonged to the Wesley Methodist Church, where he was a teacher in the Home Planners Class. A registered professional engineer in Massachusetts, he was also a member of Sigma Xi, the American Society for Engineering Education, the American Society for Testing Materials and the ASME.

In World War II, he served with the U.S. Navy and was captain of a minesweeper in the Pacific. He joined the Naval Reserve after the war, later retiring as a lieutenant commander.

David P. Gracie, '74, who graduated with a degree in business, died in San Francisco, CA, on September 10, 1982, following a brief illness. He was 30 years old.

At the time of his death, he was chief systems programmer and analyst for the Levi Strauss Co. A native of New Bedford, MA, he belonged to AEP and the Baptist Church.

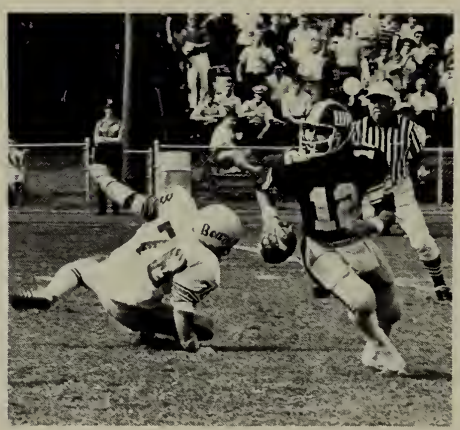
HOMECOMING '82:

Oh, how they loved it!

Count Homecoming '82 as one of the best ever. From turnout to festivities to weather, by all accounts '82 was a year WPI homecomers will remember with the fondest of memories. Hope to see you next year!

Marek Nowak

Michael Carroll



Michael Carroll

Roger Perry

Michael Carroll

Clockwise from top right. L to R: Ray Forkey, '40, Bob Martin, '39, and Ken Blaisdell, '40, pow-wow over days past, present and future. Soph quarterback John Scacciotti of Maynard led the Engineers' romp over Coast Guard. That's Prof. Al Ferron, '57, with wife Lil and hungry friends at their well-appointed tailgate party. Winners (?) of the annual Rope Pull. Michael ('78) and Laurel Wiljanen ('79) Neece with Dean John VanAlstyne.

Walter L. Abel, '39, (R) confers with fellow Emhart Corporation robotics specialist Alan Drane at WPI's Manufacturing Engineering Applications Center. The story on robotics at WPI starts on page 4.

WPI Journal

WORCESTER POLYTECHNIC INSTITUTE APRIL 1983

WORCESTER POLYTECHNIC INSTITUTE
MAY 26 1983
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Mr. Roebling's Bridge

Poly Club Installs WPI Athletic Hall of Fame

In late January, Poly Club and WPI officials put the finishing touches on an idea which has been nearly ten years in the making. The goal? To formally recognize outstanding individuals who have bestowed honor and recognition upon themselves and the college as a result of their involvement in WPI athletics. The idea? WPI's brand-new Athletic Hall of Fame, which is now prepared to accept nominations for its first members.

Selection of members will be based on their athletic ability, integrity, sportsmanship and character, with special emphasis on the athlete's contribution to WPI and to the teams on which he or she played. In addition, membership may also be offered to non-athletes who have provided distinguished service to WPI athletics—for example, coaches, staff, faculty, and alumni.

Know of a deserving member of the WPI community—now or from the past? Why not take a few minutes to complete the nomination form. Please provide as much information as you can. The nominee need not be living to be eligible, nor must he or she be a WPI graduate. Just one condition: Athletes are eligible for nomination no sooner than five years after their class graduates, while coaches, staff, faculty, etc., are eligible at any time.

Above left: Rich Testa, '84, of Wayland, MA, 1982-83 New England Champion at 118 pounds. WPI grapplers finished the regular season 16-2-1, ranking 16th in the nation. The team placed third in the New England College Conference Wrestling Association championships.

Above right: Kim Fay, '86, of Nashua, NH. Women's basketball compiled a 20-5 season and won the Eastern Collegiate Athletic Conference North Women's Division III championship. Quite a showing all around!

Nomination Form
Worcester Polytechnic Institute—Poly Club Athletic Hall of Fame

Nominee _____ Address _____

Occupation _____ Home phone _____ Business phone _____

Community activities _____

Year graduated (if applicable) _____

Sport(s) played (if applicable) _____

Athletic accomplishments, honors (WPI, regional, national) _____

_____

Other honors received _____

List any available statistics on nominee's performance while at WPI. _____

_____

_____

Please comment on why you feel this nominee should be placed in WPI's Hall of Fame. Indicate the intangibles; the information that would not be found in the record books or on statistic sheets. (Use extra sheets if necessary.)

_____

_____

Submitted by _____
Name Address

Those nominated who are not elected are eligible in any ensuing years. The first Hall of Fame Dinner is scheduled for Homecoming Day, October 1, 1983.

Mail completed form to: Poly Club, Worcester Polytechnic Institute, Athletic Department, Worcester, MA 01609 ATTN: Hall of Fame Committee

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WORCESTER POLYTECHNIC INSTITUTE

VOLUME 86, NUMBER 4 APRIL 1983

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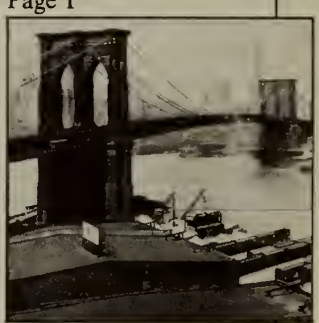

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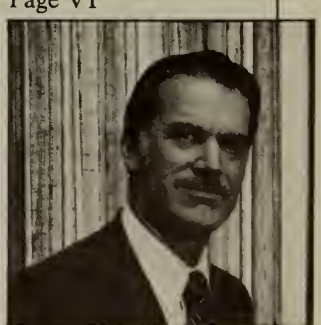

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Cover: The Brooklyn Bridge. Photograph by William Denison.

The Many Sides of Financing College Costs — with Wisdom

For parents of college-bound children, meeting skyrocketing costs can be tough. A leading tax expert offers no-nonsense, ambitious strategies for financing college, reducing your taxes—and keeping the IRS off your back.

by Alexander A. Bove, Jr.

As we go to press, President Reagan has just proposed to Congress legislation to establish Educational Savings Accounts (ESAs). Similar to Individual Retirement Accounts (IRAs) in terms of their tax benefits, ESAs are designed to encourage saving and thus to help savers finance their children's college education.

But while Mr. Reagan's idea is a step in the right direction, many educational groups believe that the proposed legislation would stop far short of offering real relief to weary taxpayers. For example, the National Association of Independent Colleges and Universities (NAICU) and others support the concept behind the Reagan bill, but have publicly called for greater flexibility and additional tax benefits.

Our space does not allow a detailed discussion of this issue. But one thing is certain: the ESA proposal will be debated in this session of Congress. Moreover, in some form, it stands a good chance of passage. And, to be sure, the popular press will give full coverage to the ongoing, urgent debate over tax-favored financing of college costs. We urge you to remain abreast of developments as they occur.

Tax-favored financing of college costs, like any financial strategy, can be technically complex and may present pitfalls for the unwary. We advise the reader to consult his or her professional tax advisor before engaging in any aggressive financial maneuver.

Quotations are wonderful things. They can convey the wit and wisdom of the ages in a sentence or two, and some live on virtually forever. With any piece of wit or wisdom, however, there can be many sides. For example, someone once said: "Education is what you have left over after you've learned." Here's my definition:

"Education is a financial transfusion from you, the parent, to the college, where practically nothing is left over except the hope that your child will appreciate the sacrifices you made and will use the education you provided."

But quotations don't pay the bills, and in this case, the bills can have harmful effects. Soaring educational costs are now a given. About the only thing we can do, aside from scholarships, grants and educational loans—all of which are becoming more and more difficult to obtain—is to optimize the transfusion so the actual cost to us (parents) is as little as possible.

In other words, pay the educational costs with after-tax dollars. Failure to do this can as much as double the cost, depending on your tax bracket.

Simply illustrated, tuition payments are not deductible, so a parent in the 50-percent tax bracket must "use" $10,000 of earnings to make a $5,000 tuition payment. The trick is to let someone else—the child—produce the funds in his own, lower tax bracket, so the overall cost is less. There are several ways to do this.

The approach to tax-favored educational costs can be divided into two basic taxpayer groups: those who plan and the rest of us. If you fall into the first category and you are planning now for the education of children who will be going to college five, 10 or 15 years from now, congratulations. (You probably also have perfect teeth and always file your tax returns on time.) In this case, you can consider such things as yearly gifts (under the Uniform Gifts to Minors Act), "10-year" or short-term trusts, interest-free loans, gifts and lease-back arrangements and other maneuvers. In general, the more time you have to accumulate funds in a lower tax bracket, the better off you (and the child) obviously will be. If your child (or any other college candidate under your charge) needs the funds now, it is a bit more difficult—but not impossible. Let's start with minors.

Under the Uniform Gifts to Minors Act, gifts may be made tax-free (not tax-deductible) to anyone under the age of majority (18 in Massachusetts) in the name of a custodian for the minor. During the period of minority, all income earned in the account will be taxed to the minor (no federal tax unless income exceeds $1,000), and the accumulated amount may then be used for college after the minor reaches the age of majority, with no tax consequences to the parent or other donor.

The account can be funded with cash gifts or gifts of securities. If the securities have appreciated, the capital gain will be taxed to the minor.

For gift-tax purposes, each year you may give $10,000 and if you have a spouse you (or she) may give an additional $10,000 per child (or other donee). If the gifts are to be presently used for tuition or other college costs, you may exceed the $10,000. Even if you do exceed the $10,000 tax-free gift limitation for things other than tuition, the sky will not fall. You then merely begin to use up a part of the allowable gift-tax credit.

The problem or potential risk with the Gifts to Minors Act is that you have no control over the use of the money. Once the child is an adult, he has a right to use the funds any way he likes. Of course you could remind him of the old quotation: "spare the rod. . . ."

Clifford Trust Helps You Save

The Uniform Gifts to Minors Act is a relatively easy way to make gifts to children for the purpose of ultimately funding a college education . . . easy, that is, in the sense that the transfer of money or property to the child is relatively uncomplicated and you avoid such "costly" things as lawyers' fees.

The problem, however, with the Gifts to Minors Act is that not everyone can afford to give away after-tax-dollars of $3,000 (now up to $10,000) per child per year.

Among the many alternatives we will discuss is a method which, although a bit more complicated, allows you to give up only the use of the money or property to the child, so that after this period of use (it must be for at least 10 years), the property is returned to you. This is done through a trust, often called a Clifford trust, a short-term trust, a 10-year trust or a reversionary trust.

During this period of at least 10 years, all of the income from the property you have placed in your Clifford trust will be taxed either to the trust or to the child, depending upon whether it is held in the trust or paid out to the child, respectively. This can result in substantial income-tax savings, depending, of course, on the property transferred and the amount of income generated. For example, say that Dad transfers 500 shares of Electric Light & Power Co. stock to a Clifford trust for daughter, who is age 8. The stock is selling for $45 per share and pays a dividend of $6 per share, or $3,000 per year on the 500 shares.

Tuition pays, in part, for faculty excellence in teaching and research, advanced laboratory equipment and up-to-date project facilities.

William Denison

In Dad's tax bracket, he would pay a federal tax of $1,500 on these dividends, but in daughter's lower bracket, a tax of only $280 will be paid. Over the 10-year period, Dad will save about $12,000 in taxes, not counting the compound interest on the savings. After the 10 years, daughter will have nearly $20,000 to use for her college education and Dad can then get his stock back, with no adverse tax consequences to him.

There are some points that must be considered with the Clifford trust to qualify for the desired tax savings. For one, the trust must last for at least 10 years after the transfer of property to it, and generally it may not be changed or terminated during this period.

Further, if any of the trust property is sold at a gain during the 10-year period, the person creating the trust (the grantor) will be taxed on the gain even though he does not, at that point, have the property or the proceeds.

Finally, the transfer of property to this type of trust constitutes a gift (even though the property will eventually return to the grantor). Therefore, consideration must be given to the amount placed in the trust.

For gift-tax purposes, as a rule of thumb only, the amount of the gift on a transfer to a Clifford trust will be about 44 percent of the value of the property transferred. In our example above, Dad transferred $22,500 of stock, and 44 percent of this would be about $9,900. Since this is less than the allowable annual tax-free gift of $10,000, Dad will have no gift-tax problems. Of course, there are many other technical requirements that your Clifford trust must meet, but these are the highlights.

One of the primary advantages of the Clifford trust is that income from specific property other than cash can be shifted to the child without selling or giving away the property. There is no other way this can be accomplished, and to a parent who cannot afford to give the underlying property away, the Clifford trust can be a tax-wise way of producing funds for education.

Gift-Leaseback Not for Everyone

When some payment or expense is converted to a tax deduction, it can actually reduce the cost, since the effect of the tax deduction is to cause Uncle Sam to bear a part of the expense.

Educational expenses are no exception. There are some maneuvers which can have the indirect effect of rendering these costs tax-deductible. One of them is the "gift-leaseback" arrangement.

This arrangement does not apply to everyone. Generally, it is limited to parents (or other benefactors) who use some form of property such as real estate or equipment in a business or profession. But given the huge number of small businesses and professional practices, it happens to be a very popular approach to financing children's college education on a tax-favored basis.

It works this way. The businessman or professional (the grantor) transfers his business real estate or equipment to an irrevocable trust for the benefit of his children. Very often, a Clifford trust is used. After the property is transferred to the trust, the trustee then leases the property back to the grantor so he can use it in his business or professional practice.

The trust realizes income from the rental payments, and a tax is paid either at the trust tax bracket (if it is not paid out to the children) or at the children's tax bracket, if the funds are paid out to them or for their benefit (for instance, college tuition and expenses). Meanwhile, the grantor gets a tax deduction for the rental payments to the trust.

For example, Dr. Forcible Pullemout transfers the equipment in his dental practice to a Clifford trust for the benefit of his two children, ages 19 and 18. The trustee is required to pay all the net income out to the children each year. After the transfer, the trustee leases the equipment to Dr. Pullemout for $6,000 per year, which in turn is used for the children's educations.

Simply stated, the doctor gets a $6,000 deduction, and the children each pay taxes on $3,000, or about $300. For the two children, the doctor would save about $2,400 per year in federal income taxes. In other words, through this arrangement, the government is contributing a clean $2,400 each year toward the children's educations.

Of course, there are some highly technical considerations with this arrangement which could affect the tax consequences in either direction. For example, because of the ability to depreciate business property, it could be that the trust or the children would pay little or no tax on the rental income. On the other hand, if the business property is subject to a mortgage on which the grantor is liable, some or all of the tax deductions could be lost. It is an area where expert advice is essential to success.

To make matters a little more delicate, gift-leasebacks are frequently examined very closely by the IRS, and if the arrangement fails to meet the accepted criteria, it will be challenged. Those who have gone before you have, as a result of many tax court cases, left a set of four basic ingredients necessary to survive an IRS attack.

First, the trustee of the irrevocable trust must be an independent party. This could include a bank, an accountant or a lawyer, but definitely should not be a grantor or any member of his family.

Second, the leaseback should not be prearranged; it should be in writing and should call for a reasonable rent after negotiations with the independent trustee.

Third, the leaseback must have a "bona fide" business purpose. (Use of the property in the business seems to satisfy this requirement.)

Fourth, the grantor (the person who is giving the property) must not retain any interest in the property. In some cases, this rule could preclude a reversionary interest, such as the return of the property to the grantor after 10 years. If this is the case, the problem can easily be avoided by having the property return to the spouse of the grantor.

Remember, these are only the basics. In addition to these tests, the documents necessary to carry out the plan must meet other technical and practical requirements. It is, nevertheless, quite do-able, and if the circumstances lend themselves to such an arrangement, thousands of tax dollars can be saved.

College "Gifts" and Borrow-back

Few things have been more dramatically affected by inflation than college expenses. And for those of us who have to pay those expenses, it hurts.

Where not too many years ago a year

Computer facilities play an increasingly key role in a WPI education. More than 100 terminals across campus link students to the school's three mainframe computers.

of college was $1,000 or $2,000, the same year now costs $4,000 to $8,000, and more. Every dime of these costs we can save, therefore, is precious.

One way to ease the bite is to have the student "earn" the college money at his lower tax bracket. The problem often is that the student has little or no money on which to earn anything. Then how about gifts to the student?

This could be helpful, but gifts, in themselves, are not tax-deductible, and once the money is used up, more gifts must be made. Repeating these gifts on a non-deductible basis each year can get pretty expensive.

Here's another idea. Make a gift (or gifts) to the student, then borrow your gift back with interest. The interest is taxable income to the student but also deductible to you. Like any tax maneuver, it must be carried out with attention to detail, but if properly done, it can work.

For example, say that Mr. and Mrs. B. want to help put their daughter through school, and the costs are $4,000 to $5,000 per year. Daughter has a little money saved, but not enough to cover all the costs. Mr. and Mrs. B. make a gift to daughter of $20,000 ($10,000 from each, so gift taxes are not a concern). Later, they borrow the $20,000 back from daughter at an interest rate of 2 points over the prime rate. At a prime of 16 percent, they will pay 18 percent per year interest, or a total of $3,600 per year; almost enough to cover daughter's college costs.

The interest is fully deductible to the parents and is taxable income to the daughter. If she has no other income, she'll pay a federal tax of about $400, leaving nearly enough to cover her costs. Parents get a $3,600 tax deduction, saving them as much as $1,800 per year in federal taxes.

At the end of her college education, daughter's parents could pay back the debt and the money could be used by daughter in starting her career. Of course, there is also the possibility that daughter, instead, would forgive the debt. That is, she could make a gift of $10,000 to each parent, but this would be *extremely risky*, as the IRS could then claim that the whole deal was prearranged and there never was a debt. If this happened, the parents' deduction would be disallowed (for at least the previous three years).

Under this gift and borrow-back arrangement, there should be an actual transfer of funds to the student, or to a trust for the benefit of the student if the student is a minor. Subsequent to the gift, the borrowing should be evidenced by a valid, enforceable promissory note executed by either or both of the parents, providing for payment of interest and a date for payment of the principal (maturity). At maturity, the note should actually be paid by the parent or parents. What the student then does with the funds is the student's business.

Shifting Income Can Save on Taxes

It seems clear that a student's college education can be cheaper for the parent if the student, rather than the parent, earns the funds necessary for the college costs. This can often be accomplished by a shifting of income from the parent to the student.

Shifting income from a high-bracket taxpayer to a lower-bracket taxpayer is a sure-fire way of saving taxes, provided you can find a sure-fire way of shifting the income. The Clifford trust, or 10-year trust, has been tried and tested for shifting income, but not everyone wants or needs to shift income for 10 years.

There is another tried and often tested way to shift income for any period you like—whether it be 10 days, 10 months or 10 years. It's called the interest-free demand loan.

The concept is simple. You, the parent (or grandparent, or other benefactor), will make a loan to the student, or to a trust for the benefit of the student at no interest, and the student or the trust will invest the loan proceeds in some income-producing fashion. The income from the investment will be taxed to either the student or the trust, depending upon whether it is kept in the trust or distributed to the student.

For example, Dad cashes in his $50,000 certificate of deposit and loans the cash at no interest to his spouse, as trustee of a trust for the benefit of their son, James, age 18. Spouse (as trustee) then purchases some four-year government agency bonds paying 15-percent interest, or $7,500 per year. The same year James enters college, with total costs of $6,500 per year, and Mom as trustee distributes the income to James, who pays an income tax of about $700 and uses the balance to pay his tuition. In the 50-percent tax bracket, Dad would have had to earn $15,000 to give James the same amount—a savings of about $7,000 (after considering James's federal income tax).

This pattern repeats for three more years until James finishes college, at which time Dad calls the loan and receives his $50,000 back. Total savings: more than $20,000.

There are a couple of important requirements to the interest-free loan arrangement. For one, the loan must be a "demand" loan rather than for a specified period of time. That is, the lender (Dad in our example) should have the right to "call" the note (demand payment) at any time. Secondly, an actual written, enforceable promissory note should be signed by the borrower (Mom, as trustee, in our example) and the note should actually be given to the lender and held until paid. Further, only money should be loaned. Loaning property other than money, particularly income-producing property such

Michael Carroll

In just ten years, the rate of student athletic participation at all levels—whether in the nine men's and seven women's varsity sports or in the 42 intramural and club sports—has nearly doubled.

William Denson

A thematic sequence of courses in areas ranging from art history and music to philosophy, literature and the history of technology and science, round out the education of the technological humanist.

as stocks or bonds, will almost assuredly produce tax problems for the lender and may defeat the entire purpose of the arrangement.

There are several very important advantages to the interest-free loan, particularly if done through a trust. For example, if James does poorly and drops out of college, Dad could call the loan and get his money back immediately. On the other hand, if James went on to graduate school Dad could simply let the loan continue. If at any time Dad needed a portion of the funds he could call a portion of the loan. It is this tremendous flexibility of time and control that can make the interest-free loan much more desirable than the 10-year Clifford trust.

There is one other point that you should realize about interest-free loans. The IRS hates them. The reason is partly that it is such an easy, straightforward way to save taxes, and partly because it is such a "low-profile" arrangement (it is difficult for them even to be aware of it since there is no requirement to report such a loan), but mainly because almost every time they have challenged the arrangement in court, the IRS has lost. For this reason, advisers generally recommend the use of interest-free loans as an effective way to shift income, especially for college educational expenses.

A Court Decision for the Big Guys

In a recent U.S. Court of Appeals decision, however, the court held, in effect, that giving someone the use of money for no interest, or for a rate less than the market rate, is a gift, taxable to the donor/lender.

After having lost every one of the many court battles on interest-free loans of this sort, the IRS is justifiably jubilant over the victory and no doubt still partying in celebration of this landmark decision, which involved more than $80,000 in delinquent gift taxes and additional charges to the Dickman family of Florida, which made the loans.

Involved were hundreds of thousands of dollars' worth of interest-free demand notes from Mr. and Mrs. Dickman to their son, Lyle, and to a closely held corporation. As in their past attacks on these loans, the IRS contended that the use of the money at no charge was no different than a transfer of property by gift. The gift-tax laws, they argued, impose a tax on the transfer of property by an individual for less than adequate and full consideration. The value of the gift for gift-tax purposes will be the value of the "property" transferred less the amount received by the donor.

Remember that in this case we are not talking about the amount of the loan, but rather the value of the use of the amount of the loan for a period of time. This, the IRS said—and the court agreed—was the property right that was given, and it has a clear and definite value. In other words, what would it cost if you were to ask a bank or other lending institution to let you use, say, $10,000 for a year? Clearly it does have a value and in the Dickman case, since nothing was charged for the use of the money, a gift was considered made at the end of each taxable period.

The fact that the interest-free notes were "demand" notes, a point which most professionals (including myself) heavily stressed to counter IRS attacks, made no difference, said the court. The only distinction there was the period involved for valuing the amount of the gift. In its holding, the court overruled the famous Crown case, which was the recent frontrunner for interest-free loan guidelines and which helped establish the importance of the demand note, as opposed to a note for a term of years.

But does all this mean that you should now steer clear of interest-free loans? Are they now a lost ark for tax savings? I say no on both counts. Here's why.

In the Dickman case the IRS made a sound argument that the free use of money can be a gift, but they also told us how they intend to value it for gift-tax purposes. It appears they intend to apply the same interest rate, as a measure of the value of the gift (not as a tax), that they apply to underpayment of taxes and tax refunds. This interest rate is set in October of each year according to the (rounded-off) prime interest rate in September.

In other words, [using a hypothetical 12-percent prime] at this rate as a measure of the use of the funds, an interest-free loan of $83,000 for one year would constitute a gift of $9,960. Because of the $10,000 tax-free gifts which may now be given each year to a donee, there would be no gift-tax problem with this interest-free loan. And if a spouse consents to the use of his or her additional gift-tax exclusion, an interest-free loan of $166,000 may be made (if the 12-percent rate applies)—more if the rate goes down, less if it goes up.

Furthermore, even if you exceed the gift-tax-free amount, you can still apply a part of your unified tax credit, so the possibility of having to pay a gift tax under current law is quite remote, unless you want to loan, say, a million or more, in which case I'd like you to know that my credit is very good.

So you can see, despite the import of the Dickman case and the fanfare it will no doubt be given, for us small-to-medium-sized shooters, the interest-free loan is still very fair game.

Deductions Now Lead to Cash Later

As we have seen, tax-wise financing of college education is limited by only three things: the expert advice available to you, your personal and family circumstances, and the amount of money you have.

Generally, those persons who have more money will benefit more than the rest of us from creative tax planning for otherwise non-deductible educational expenses. One effective maneuver frequently used by the heavy hitters is converting a tax shelter into a scholarship fund.

During the past few years, so-called tax shelters have become extremely popular as a tax-deferring device.

Basically, shelters allow the investor to defer taxes by providing a current tax deduction which comes back to the investor later (called a "recapture"), sometimes in the form of a cash flow. For the most part, these shelters are in real estate or oil and gas ventures. By taking advantage of the current deduction, then shifting the recapture income to the child in a lower bracket, the tax payer makes an effective double-play against the IRS.

For example, say that Mr. B. invests $25,000 in a conservative oil and gas investment for 1981, which in turn gives him a tax deduction of a like amount. In the 60-percent tax bracket, this saves him $15,000 in taxes. In 1982, while the venture is still developing its prospects, Mr. B. transfers his entire share in the venture to a trust for the benefit of his daughter, who expects to begin college in 1983. Because of the uncertainty of value and restricted marketability of the share, in all probability the value of the gift in 1982 for gift-tax purposes will be nominal, and Mr. B. will not have to use any of his allowable gift-tax credit. Further, the trust could be a Clifford trust, where Mr. B. would recover his interest in the venture after 10 years, if he wished.

In 1983 the venture begins to produce a cash flow of $500 per month to daughter's trust. If the payments are eligible for the current oil-depletion allowance benefit, simply stated (it can be unbelievably complicated) this is 22 percent of the $500 monthly payments, and that amount would be tax-free. The balance would produce an annual tax of about $200, leaving $5,800 after taxes to finance daughter's education. (Even if daughter's income were not eligible for the oil-depletion allowance, which is quite possible, there would only be a tax of about $600 for the year.) Hopefully, this income would continue over a period of years, at a cost to Dad of only $10,000 ($25,000 investment less $15,000 tax benefit).

Now for the warnings. (You knew they had to come!) Tax shelters are by nature speculative; this is one of the reasons Congress gives them favorable tax treatment. Therefore, there is no guarantee of the projected cash flow. And even if there is a cash flow, it may not be consistent.

Second, the complicated nature of the tax laws make this maneuver a very delicate one; consequently, it should only be considered after obtaining the best expert advice available. Nevertheless, there are

The end. And a new beginning.

Marvin Richmond

Facts and Figures

But what of *students'* attitudes toward financing of their college costs? The January 26, 1983 *Chronicle of Higher Education* reported that in a survey of 188,000 students who entered college in the fall of 1982, more than 68 percent had "some" or "much" concern about financing college. (Some 12 percent named engineering as their probable career occupation.)

Only 28 percent of the overall sample received no support from parents while 29 percent got more than $2,000 from home each year. And among the 22 types of state, federal and college aid identified, respondents who received "none" from any given source ranged from a low of 57 percent to a high of 99 percent. Clearly, families are footing the bulk of their children's college costs.

Meanwhile, reports Edgar Heselbarth, Director of WPI's Financial Aid Office, 75 percent of WPI undergraduates receive some sort of financial aid. The college itself has awarded $2.35 million in financial aid for this year alone, from endowment monies and operating income.

Among 23 private, non-Ivy League New England colleges, between 20 and 52 percent of 1982-83 freshmen were awarded college-based aid (i.e., not state, federal or private), according to a survey conducted by the Eastern Group of Admissions Directors (EGAD). WPI's share is 50 percent.

"The plain fact," contends Assistant Director Michael Curley, "is that students and their families dig down deep for the chance to attend WPI."

many such ventures designed to produce current deductions with future cash flow, which lend themselves neatly to this tax-savings plan.

When a Gift Means Savings

I should be ashamed of myself, one reader told me. It is just not fair that she had already paid thousands for college education of children without any tax advantage, and here I was telling others how they could finance education through tax-saving schemes. What can I say? I guess some horses are never led to the water.

Unfortunately, it is a fiercely competitive world, particularly from the standpoint of tax planning. One must often take an aggressive position and should always ask, "Is there any way this expense/investment/transaction can be structured to give me a tax advantage?" College costs are no exception.

We have explored several ways of reducing educational cost through tax benefits, and the main thrust has been the shifting of taxable income to the child, so that the child can use this income (in a lower tax bracket) to pay his own college expenses at a lower overall outlay of cash to the parent or other sponsor.

For a quick recap, the several ways that seem to work include:

- Outright gift to the child (or to a custodian under the Uniform Gifts to Minors Act) where, although the gifts themselves are not tax-deductible, the income from the gifts is taxed to the child, thereby saving the parent tax dollars each year.
- Gifts of income-producing property to a 10-year trust, so that the child (or the trust) collects the income in a lower tax bracket for the 10-year period, and after that the property returns to the parent or someone designated by the parent.
- Gift (or sale) of business or professional property to the child or to a trust for the benefit of the child, which is then rented back to the parent or other sponsor. The rental payments are deductible to the parent and taxed to the child or the trust at a lower bracket.
- Gifts of money to the child or to a trust and a subsequent borrowing back of the money by the parent, at a substantial (but fair) interest rate. The interest paid is deductible to the parent and taxable to the child.
- Interest-free loans from the parent to the child or to a trust for the child. The child or trust then invests the borrowed funds to generate income at a lower tax bracket, while the parent/lender may recall the loan at any time. The funds used to make the interest-free loans could be savings, or funds borrowed from your own retirement plan or insurance policy, or even from a second mortgage on your home.
- Gifts of a tax-shelter interest after the deductions have been taken but before the income is generated, so the parent receives the tax benefits on both sides, but this can only be done with certain types of shelters.
- Employing your child in your business and paying his wages. The wages are deductible to you and only taxed to the child if they exceed $3,300 for the year (assuming he has no other income). Of course, the child should actually render services to your company.
- Any other legitimate maneuvers that you and your tax advisors can dream up.

As a general rule, you should be sure that none of the income earned by your child or your child's trust is to be used to satisfy any of your legal obligations. To the extent that it is, then that amount will be taxed to you, the parent. For example, if you sign an agreement to pay $3,000 for the first year of school and it is paid out of the child's trust, then the $3,000 will be income to you, regardless of how carefully the trust was set up.

Unlike many other, more sophisticated tax schemes, financing of college education through one or more of the approaches suggested in this article is available to everyone, not just the big shooters. Consequently, if you are to survive, you must revise your attitude and think of these tax plans as fruits on a tall tree, then make arrangements to pick those within your reach.

Alexander A. Bove, Jr., is a Boston lawyer whose column, "The Family Money," appears weekly in the Boston Globe. *Reprinted with permission of the author and the* Boston Globe.

ANIMALS IN THE ARTS

Art by Clinton Arrowood

These anomalous creatures are in the tradition of Arthur Rackham and Ernest Shepard. They are animals, yes. The frogs show a froggy leaping bravura. The sheep are dumb and dignified. The alligators are sleepily rococo. But they also display all the traits of the singers, dancers, and musicians they portray.

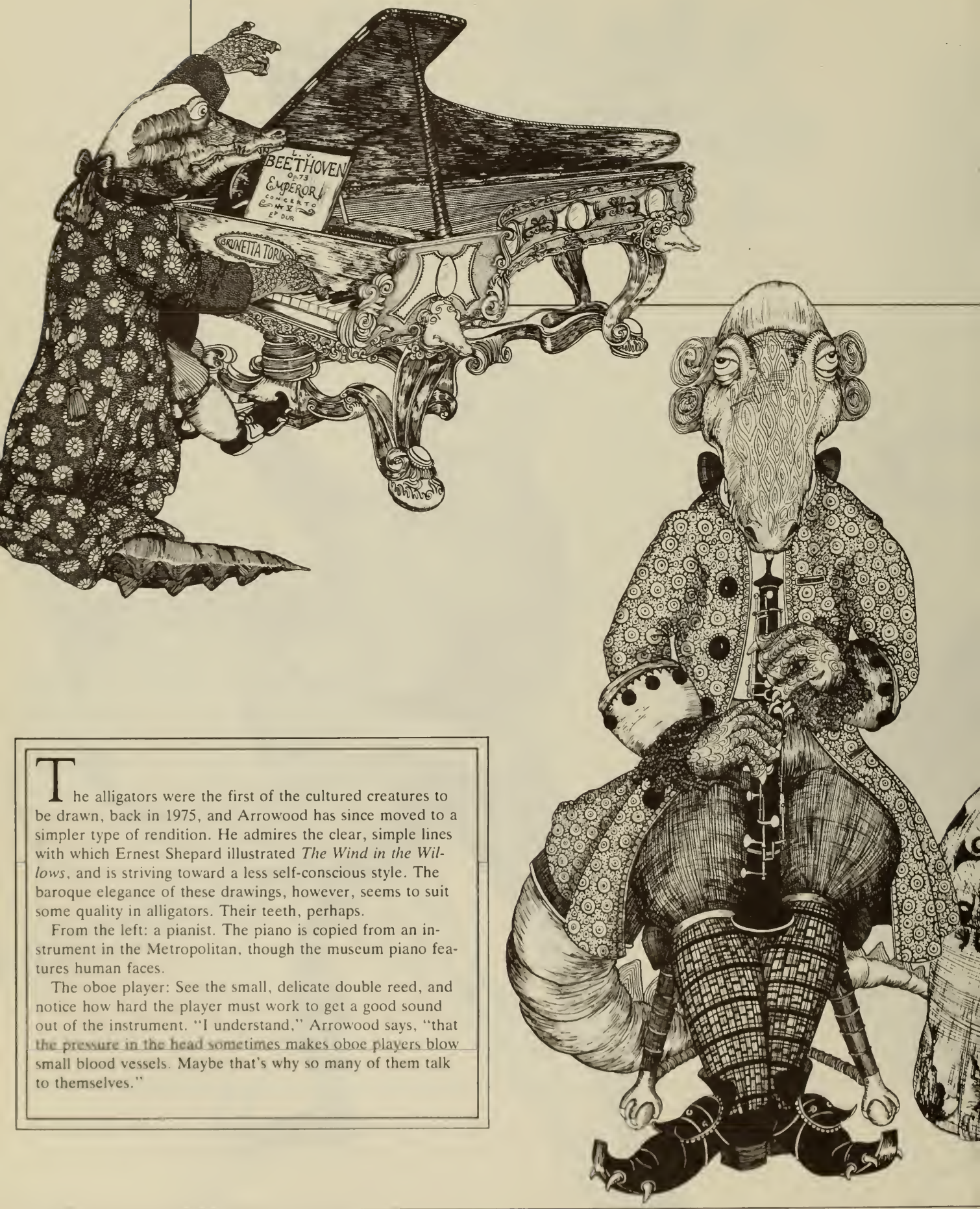
At right is the lovely Cho-Cho-San, Puccini's Madame Butterfly, who commits hara-kiri for the sake of one Lieutenant Pinkerton. Notice her air of operatic self-possession: she is sure she belongs at center stage.

The *corps de ballet*, at the back of the stage (above), has marsh grass as a headdress. Downstage, this frog executes a *grand jeté* (a great leap), while the harlequin performs a *cabriole* (literally, a caper) and the couple a *pas de deux*. "The frog possesses an essential quality that a lot of real live dancers should envy," Arrowood comments.

Arrowood believes he got the idea of dancing frogs from the Royal Ballet of London, which performed a version of Beatrix Potter tales some years ago. He was transfixed by the image of Jeremy Fisher leaping across the stage.

Arrowood tries to make his frogs anatomically correct, which is why their torsos bulge and their feet sickle—these are, after all, frogs. But he has endowed the female dancers with mammaries and eyelashes, "just to give them a little more feminine charm." The dancing, however, so far as the frogginess of the models allows, is correctly performed.

When he draws, he starts with the eyes. "I don't really feel comfortable until I've got the eyes. But once the eyes are done, I feel I've established some contact with the drawing and the rest of it flows."



The alligators were the first of the cultured creatures to be drawn, back in 1975, and Arrowood has since moved to a simpler type of rendition. He admires the clear, simple lines with which Ernest Shepard illustrated *The Wind in the Willows*, and is striving toward a less self-conscious style. The baroque elegance of these drawings, however, seems to suit some quality in alligators. Their teeth, perhaps.

From the left: a pianist. The piano is copied from an instrument in the Metropolitan, though the museum piano features human faces.

The oboe player: See the small, delicate double reed, and notice how hard the player must work to get a good sound out of the instrument. "I understand," Arrowood says, "that the pressure in the head sometimes makes oboe players blow small blood vessels. Maybe that's why so many of them talk to themselves."

With the foxes and the hunting horns on her costume, this French horn player honors the hunting ancestry of her instrument. She has a self-satisifed look, as if her fellow horn-players were softly shuffling their feet to applaud a solo passage. "That's the ultimate compliment," Arrowood says—he is a flutist—"because your peers really know whether you played well or not."

Above, a noble trombone player sports a fur-lined coat, proud that his is the oldest instrument in the orchestra.

The books in which these creatures appear can be ordered from Gambit Press, 27 North Main Street, Meeting House Green, Ipswich, Mass. 01938. Ask for *Lambs' Tales from Great Operas, Alligators and Music,* and *Frogs and the Ballet*, by Donald Elliott and Clinton Arrowood.

Mr. Roebling's Bridge

"When constructed in accordance with my designs . . ."

by Robert Kanigel

Photographs by William Denn

opening, as will the Brooklyn Bridge this May 24. On tap are a parade, a sound and light show, a harbor salute, and a musical composition commissioned in its honor.

There are longer suspension bridges than the Brooklyn; the Williamsburg is one of them, by five feet. And there were other suspension bridges that preceded it, though at the time, none so long. But no bridge in history, it seems fair to say, has captured the imagination of so many people as the Brooklyn Bridge. It is a one-of-a-kind cultural symbol. It is the quintessential American bridge.

Rensselaer Polytechnic Institute Archives

1877: Seven years into construction, the four massive cables that support the bridge, each consisting of 6,000 individual wires, are scarcely begun. Posing on the footbridge is a group of company trustees.

For Robert Gough, the centennial hoopla has been a bit of a bother. As Chief Engineer for Bridge Operations of the New York City Department of Transportation, Gough has all the many hundreds of the city bridges in his care. So numerous are the writers and photographers who want to explore the Brooklyn Bridge as the centennial draws near, he says, that it amounts to "a regular tour of the thing; you've got people bumping into each other on the cables." And actually climbing them: A photographer wishing to take pictures from atop one of the bridge's 276-foot granite and limestone towers must reimburse the city, at $27 per hour each, for the two ironworkers needed to help him navigate a steeply-pitched, 15-inch diameter cable, with only guy wires and safety harness for support. People do it, eagerly. It's the only way up.

Gough has a bachelor's degree in civil engineering from City College. Some years ago, he registered for a master's program at Columbia University. But after a taste of all that theoretical math, he says, he decided he didn't need it; down to earth, practical engineering was more his speed. Such as maintaining bridges.

The bearded, 44-year-old engineer is cordial, and he displays a knowledge of the bridge's history far more extensive than his job demands; it's plain he doesn't resent the attention the Brooklyn Bridge is getting. Yet something galls him about all the centennial goings-on: "The city has been ignoring the bridge for a hundred years," he says. "Now it's basically one year of activity, and then they'll go back to ignoring it."

In the shadow of the bridge, along Pearl Street in Manhattan, an old Chinese man limps wearily along. Vehicles stream by in infinite variety. Next to a bridge pier, squared-off piles of new brick stand beside scraps of stone and virgin trees: The city is making a small brick-paved park to coincide with the centennial. A group of boys on BMX bikes take turns rolling down a steep brick embankment that's part of it. A woman drags an unhappy-looking little girl behind her. A dead car reduced to a hulk, denuded even of its wheels, lies sprawled alongside the curb. "The single most beautiful object in New York," writer Nicholas King has called the Brooklyn Bridge. But it is from the ragged clutter of a sometimes ugly city that the bridge rises.

It begins in a great bowl, the rim of which is formed by the surrounding office towers. In the middle of the bowl, as converging highway ramps wrap around it, the bridge gashes up through the bottom.

For a Brooklyn-bound pedestrian, the bridge begins inauspiciously: You are confined to a raw, concrete path, pressed in on either side by speeding auto traffic. At this point in your trek, it's a matter of semantics whether you're on the bridge proper or on the Manhattan street system that feeds it.

In time, you reach a stairway, two sets of seven steps each, and abruptly it's as if the city dropped away: Ahead, supplanting the bare concrete, stretch a wood-slatted promenade, the soaring cables, the great gothic towers. The roar of traffic still strikes the ear, but now it's more distant to the eye. Now the cars speed below you, hedged in by steel trusses. Up here, everything seems neater, more ordered, more spacious. The array of wood slats stretching out before you in a wide ribbon is somehow welcoming. Walkers and cyclists seem unhurried—a rarity in this nervous city. An occasional wood bench recalls a boardwalk, or a quiet park.

After maybe 50 yards, the bridge's four great cables begin their ascent from beneath the roadway, bound for the tops of the towers looming ahead. Wire rope suspenders plunge from the cables, holding up the roadway. At the Manhattan tower, well out over the East River, another short stairway brings you yet further above the traffic. And here a steel web of vertical suspenders and diagonal stays, tied together at knot-like junctures with loops of metal, trembling a little as the traffic roars past, irresistibly compels attention. There are four vertical planes of criss-crossing stays and suspenders, one for each cable, and the lines of the foreground (or inboard) planes form diagonal windows for viewing the outboard ones. Trapezoids and triangles are everywhere.

These suspenders and stays form filigree walls flanking you on either side; only a narrow slot of unobstructed sky remains, directly above. But near midspan, as the cables dip down again to the roadway, the slot grows wider, the walls smaller, until finally they vanish. And it is here, out in the middle of the river, that the designer's vision seems most perfectly realized: Almost 800 feet from either tower, you're half a mile from either shore and 135 feet above the river, and the city streets in all their angry commotion are far out of mind and sight. Here, out over the water, as a stiff wind blows up the East River, it is just you, and the steel, and the sky, and the perfect catenary curve of Mr. Roebling's cables.

Dear Father," Washington Roebling wrote from the Royal Hotel in London on July 19, 1867. "Last Sunday, I paid a visit to the two Suspen-

John Roebling's first sketches for the towers showed an elaborate Egyptian doorway with a spread-eagled gargoyle, and two varieties of Roman arch. The Gothic arch at right was apparently an afterthought. Above, each encrusted in decades of paint, a vertical suspender meets a diagonal stay.

sion Bridges over the Thames—the Lambeth and the Chelsea bridges. The former is a wire rope bridge with two cables on each side each consisting of 7 ropes in 6 x 6; each cable is nearly 6″ in diam. They are painted with a black varnish and have the cracks in the upper side filled up with cement to shed the water . . ."

Washington's father was John Roebling, who planned to soon build the longest suspension bridge in the world. It would be some 500 feet longer than the current recordholder, one he'd also built, across the Ohio River at Cincinnati. The Brooklyn Bridge was to use, for the first time, cables made of steel, which still bordered on being an experimental material. Its towers would be, as someone would put it years later, "about the largest, most massive things ever built on the entire North American continent." They were to rest on immense foundations, 102 feet by 162 feet in section, built using a new technique involving pneumatic caissons—submerged boxes filled with compressed air in which men could work underwater. There was much, though, that John Roebling didn't yet know about caissons. So in the spring of 1867, he sent his son Washington to Europe, with his new wife Emily, to report back on bridges in general and on caissons in particular.

For nine months, Washington's long, detailed, neatly scribed letters arrived at his father's big house in Trenton, New Jersey. The Roeblings, apparently, were neither of them much for long preambles or elaborate expressions of fond feeling: *Dear father*, Washington's letters would invariably begin. Then he'd launch directly into an elaborate treatment of Telford's bridge over the Menai Strait, or Brunel's bridge at Clifton. . . Kircaldy's materials testing machine was big enough to take a specimen 15 feet long, boasted a theoretical capacity of one million pounds . . . The caissons he saw in Koenigsberg, in Germany, each had a large dredging cylinder in the middle and two main shafts . . . At the Paris Exposition, he'd seen 12-inch rolled beams 55 feet long . . . He wrote about steel works he'd seen in Manchester and in Essen; about wiremaking and the latest developments in metallurgy. And he reported all this in elaborate, no-nonsense detail, down to the nuts and bolts, supplying dimensions and weights, accompanying the text with little sketches and diagrams. *Yours affectionately, Wash. A. Roebling*, he'd sign them.

It was during this period that his father drew up plans for the great bridge. John Roebling had come over from Muhlhausen, Germany in 1831, at the age of 24, armed with a diploma from Berlin's prestigious Royal Polytechnic Institute. His mind burned with ideas. He was immensely ambitious. He had no use for the bureaucracy of the Old World. Back there, he wrote in his diary, nothing could be accomplished "without first having an army of government councilors, ministers, and other functionaries deliberate about it for ten years, make numerous expensive journeys by post, and write so many long reports about it, that for the amount expended for all this, reckoning compound interest for ten years, the work could have been completed."

With other German immigrants, Roebling had founded Saxonburg, a kind of utopian farming community in western Pennsylvania. The first house to go up was his own and, as one biographer has noted, "like everything he ever built, it was built to last." Saxonburg was modestly successful, but Roebling himself was an engineer, a builder, more than a farmer, and pretty soon he was building: He built dams and locks. He built aqueducts. He started manufacturing wire rope, using a process then known only in Europe; ultimately, he moved both the business and his family back east to Trenton. He built bridges, invariably of the suspension variety. "Suspension bridges kind of tickled his fancy as being somehow 'natural' in the way they expressed function through form," says Bob Gough of Roebling. He was, by all accounts, something of a genius, and before long he'd built a name for himself as perhaps the pre-eminent bridge engineer in America. And in 1867, in the space of three months, he designed the Brooklyn Bridge.

The Brooklyn Bridge today looks just about as John Roebling thought it ought to look. It is built where he said it should be built. And it stands today in conformity to calculations he performed that said it ought to stand. But in 1869, while he and son Washington were at a ferry slip inspecting the site for the Brooklyn tower, an incoming boat caught him unawares and crushed his foot. Tetanus set in. He

Robert Gough, the city's chief engineer for bridge operations, has hundreds of New York City bridges in his care. This one gives him less trouble than most.

died. He never built the bridge it was his dream to build.

His son Washington—32 at the time, a Civil War hero, one of the earliest graduates of Rensselaer Polytechnic Institute and an accomplished bridge engineer in his own right, fresh from his "post-graduate" engineering vacation in Europe—did it instead.

From the time in late 1869 when workers began preparing the site for the Brooklyn caisson to the time in the spring of 1883 when the bridge was opened, 14 years passed. It took a year just to sink each 3,000-ton caisson into the bed of the river; six years to finish the towers, each of which consumed some 40,000 cubic yards of masonry mined from no less than 20 quarries; two years to spin 14,000 miles of three-sixteenth-inch diameter wire into the four great cables.

The period saw the revelation of scandal after scandal, with many more whispered for each one proved; the notorious Tweed Ring had, after all, played a major role in gaining a go-ahead for the bridge, and commercial interests had supplied the prime impetus for its construction all along. To this day, its cables contain 221 tons of wire that had been rejected by inspectors—"brittle as glass," Washington Roebling called a sample of the stuff brought to his attention—yet surreptitiously diverted to bridge use. The cost of the bridge soared from the $7 million John Roebling had forecast to more than twice that figure, $15 million.

During construction, a fire broke out deep in the Brooklyn caisson and, fed by air under pressure, ate into the caisson's wood beam roof for two weeks after it was thought to be extinguished; ultimately, the fire ate almost a third of the way through the 15-foot thick roof. The burned-out sections were cleaned out and buttressed with wood and cement.

A mysterious ailment, "caisson disease," took the lives of three workers and caused awful cramps and convulsions in many others. "The bends," we know now, are caused by nitrogen boiling up from the blood upon too sudden a release of pressure—which is just what the men experienced upon emerging from the pressurized caisson. Eighteen months into the project, Washington Roebling was himself afflicted. It brought him close to death and apparently contributed to a mysterious nervous affliction which turned him into a recluse.

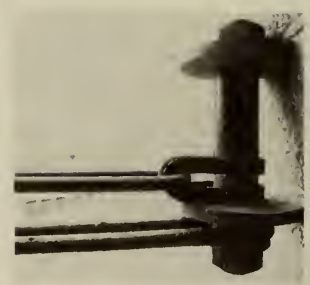
All of Roebling's engineering staff but one remained on the job the entire 14 years it took to finish it. During most of that time, the Chief Engineer never so much as set foot at the construction site; he worked out of his home in Brooklyn Heights. His wife Emily therefore came to play a key role in the day-to-day conduct of the work, as private secretary and the relayer of his directives, as intermediary and fence-builder, deftly parrying attacks on her husband and his plans. Along the way, she apparently amassed considerable engineering knowledge. "She became," as bridge scholar David McCullough told a gathering of the Rensselaer Alumni Association a few years ago, "as accomplished a civil engineer as anybody on the job. And in fact, toward the end she was actually making decisions—quite good decisions." Today, a plaque on the bridge acknowledges her important role.

All told, 20 men, out of the thousands who at various times worked on it, were lost to the bridge: Three men died in falls from towers. A man named Cope died when his leg got wrapped around the drum of a hoisting engine. A carpenter was killed by a falling stone . . .

But in the end, the bridge got built.

A nineteenth-century engineer once calculated—he was, plainly, trying to make a point—that to cross a hundred foot gorge, you could step out across a wrought iron bar nine inches wide, 27 inches deep, and weighing 44 tons; or else you could shimmy across along a thin steel wire weighing 13 pounds. A suspension bridge is little more than many such wires from which a roadway is slung.

Indeed, the thing about a suspension bridge apt to leave the most forcible impression is that there's not much to it: So little does so much. A cantilever bridge, like that spanning the Firth of Forth in Scotland, say, is a grand affair with trusses and girders and beams enough to darken the sky. The same goes for an arch bridge, like the Bayonne Bridge linking Staten Island to New Jersey: They look substantial, crowded with strength. A suspension bridge, on the other hand, especially at a distance, seems ethereal, ephemeral, lit-



The Douglas fir slats of the bridge promenade, left, are soon to be replaced by a durable South American wood called greenheart, which is so heavy it won't float. Above, a construction detail—scavenged from the parts drawer of a Brobdingnagian mechanic?

tle more than the vine suspended across the stream that bridge historians guess was its original form.

Now consider crossing that flimsy trail of vine hand over hand: The dead weight of your body is not the only load the vine must endure. Because, unlike a log thrown across a stream, the vine lacks rigidity. Conceivably, even if your weight would not break it, by slinging yourself across you could set it to twisting and shaking and thrashing so much that finally it *would* break.

Which is just about what can happen with a suspension bridge. In *The Great Bridge*, David McCullough has written what is arguably the definitive work on the subject of the Brooklyn Bridge. And in it he notes that before about 1855, when John Roebling finished a suspension bridge for heavy railroad trains across the 821-foot Niagara Gorge, "suspension bridges had a dubious reputation . . . So many of them had come crashing down over the years, and frequently with tragic consequences. In England in 1831 a suspension bridge had collapsed under the feet of marching troops . . . In France in 1850 another wire bridge had failed under almost identical circumstances, killing two hundred men. In America a number of small suspension bridges had collapsed under droves of cattle." What was more, McCullough added, "nobody understood quite why these things happened."

Indeed, even 70 years and more after John Roebling drew up plans for his East River masterpiece, the design of suspension bridges apparently remained tricky enough that one across the Tacoma Narrows in Washington state thrashed itself to death in a high wind. "Galloping Gertie" set bridge engineers scurrying back to their drawing boards to review their designs, subjecting bridge models to wind tunnel tests, and even reinforcing existing bridges against wind-bred oscillations. The 2300-foot Bronx-Whitestone Bridge in New York was one suspension span that got structural reinforcements. The Golden Gate Bridge in San Francisco was another. By this time, of course, the Brooklyn Bridge had already weathered a half-century's worth of gales with scarcely a shiver of protest.

Back in 1854, John Roebling had studied the collapse of a suspension bridge in West Virginia, ascribing it to a lack of structural stiffness, just the sort on which the Tacoma Narrows disaster would later be blamed. Accordingly, when it came time to plan the Brooklyn Bridge he was not, as he wrote in his proposal for it, "disposed to underrate the great force of a severe gale, when directed toward the suspended work, and I am also fully aware that herein lies the great danger to all Suspension Bridges of ordinary design." His design, he hastened to add, was *not* ordinary.

"To guard against vertical and horizontal oscillations," he wrote, "and to insure that degree of Stiffness in the flooring which is absolutely necessary to meet the effects of violent gales in such an exposed situation, I have provided six lines of trusses . . ." In fact, he declared, the whole bridge could be regarded as "a huge truss of 1600 feet span, and of a depth of 150 ft. The Towers form one supporting element, the framing of the floor forms the second, and the extensive system of stays forms the third."

The diagonal stays to which he referred radiate out from the top of each tower and help support the roadway. In a bold exercise of conceptual salesmanship intended to point up the strength built into his design, he asked his readers to imagine the four supporting cables removed entirely! Thanks to the stays, he claimed, "the bridge would sink in the centre, but would not fall."

In an 1898 article in *Railroad Gazette*, Roebling's son Washington would cast doubt on the merits of stay construction. "The theoretic complications introduced by stays are so numerous," he wrote, "that probably no engineer would venture to use them, even for the sake of stiffness." Of course that was years later. And the fact is, whatever the scientific shortcomings of his father's reasoning, the strength and solidity of the structure are incontestable. As Bob Gough says in comparing it, favorably, to its East River neighbors, the Manhattan and the Williamsburg bridges: "The thing just sits there."

In his proposal for the Brooklyn Bridge, John Roebling predicted that "its most conspicuous features, the great Towers, will serve as landmarks to the adjoining cities, & they will be entitled to be ranked as national monuments. As a great work of art, & as a successful specimen of advanced Bridge Engineering, this structure will forever testify to the energy, enterprise & wealth of that Community which shall secure its erection."

Not only that, he might have forecast with equal confidence, the bridge would be easy to keep clean.

Roebling was "very smart about details," says Bob Gough. "And as Mies van der Rohe once said, 'God is in the details.' Every detail of the Brooklyn Bridge is really well thought out and executed." Rain, he reports, "hits it and rolls off . . . There are no pools of sitting water, no drains to clog and back up and cause rot in the structure." The bridge is easy to maintain. "There's nothing in it that is complex. It's just nuts and bolts. I think that's why people have an affinity for the bridge. Everything is so simple." So spare. And despite the bridge's structural rigidity, reports Gough, it is exceedingly light—just four tons per linear foot, as compared to 14 tons per foot for the "clunky" Williamsburg Bridge, and 12 for the Manhattan. Which means that much less to paint and keep up.

Gough occupies a large corner office in an old office building on Worth Street, in lower Manhattan. With its banks of big windows, it ought to be bathed in light.

To shoot this 50-year-old photo today, you'd have to pay the city $27 an hour each for the two ironworkers needed to take you up a cable to the top of one of the towers. It's the only way up, and always has been.

But the walls are painted brown, and the windows are covered with drawn Venetian blinds, and there's a big bulletin board that obstructs one of them almost entirely. For two hours this morning Gough has patiently answered questions about the bridge, supplying a capsule history, giving details of its construction. And now it seems he's had enough: The bridge awaits us.

A ten-story elevator descent and a ten-minute walk through lunch-hour streets, and we're out on the bridge, walking up the inclined concrete approach to the bridge proper. Gough, in his sky-blue mountain parka and his tweed cap, at last freed from the constraints of the office, seems visibly looser, more at home. "You want to see the cable?" he asks as we approach the steps leading up to the promenade.

Abruptly, he swings a leg over the railing that separates the promenade from the swarms of cars barreling down the roadway. I follow. We have to inch along a narrow curb, maybe ten or twelve inches wide, as three lanes of cars whiz by beside us. *They think we're nuts*, I think, *a pair of New York crazies playing in the traffic.* But then we scurry off the curb and under the promenade into the underbelly of the bridge. "Watch your head!" says Gough as we clamber under and around the steelwork. Under trusses, down ladders, along catwalks, and then we are there—that magic junction, that place of focused power, where the mathematical abstraction that is the catenary curve dissolves into spaghetti bundles of wires. Here, out of the wire-wrapped sheathing of the cable emerge 19 distinct strands, each consisting of 278 individual wires. Here in this narrow, confining, limestone-lined vault—"the cable pit," Gough calls it—the lines of force of some engineering diagram are transmuted into steel.

Later, coming back out of the cable pit, I inspect the underside of the bridge. It is impossibly straightforward, transparent in its workings. The whole thing is put together like a child's erector set, its nuts and bolts scavenged from some Brobdingnagian mechanic. The main cables, I notice, are attached to the wire rope suspenders with a coupling that looks just as it might in a quick, offhand sketch intended to show the *concept* of the coupling: a rounded band of metal with a hole in it. Another piece into which the suspenders fit, also with a hole through it. The whole assembly is fastened together with a big nut and a big bolt: *What you see is what you get.*

Simple, straightforward design offers no guarantee of perfection, however: In 1901, 18 years after the bridge's completion, Washington Roebling wrote to John Shea, then Commissioner of Bridges for the Borough of Manhattan, "Two adjacent suspender rods seem to have been broken for some time past," he said. "I learn also that single suspension rods have broken on previous occasions."

In the Brooklyn Bridge, the cables support the bridge roadway by three distinct means. Along most of its length, the roadway hangs from wire rope suspenders. For a brief stretch where the cables dip under the road near each anchorage, it actually sits on the cables. Finally, around midspan, the roadway hangs from solid steel rods. And these suspender rods, as Bob Gough says, "have been cracking since the bridge was built. We've got reports going back to 1890." (His men keep replacement blanks on hand that can be cut to size when a cracked one is found.)

In his letter to the bridge commissioner, Washington Roebling wrote that "the true cause of their fracture [is not] far to seek." The roadway trusses to which they attach at a slip joint move as the bridge expands and contracts with the weather. Apparently the freedom of motion built into the joint was insufficient. Roebling had a fix in mind, he told the commissioner. But no one, it seems, ever acted upon it.

In any event, this nagging little problem is at last being treated. In 1978, the firm of Steinman, Boynton, Gronquist & Birdsall was hired to inspect the bridge and draw up any rehabilitation plans necessary. A Steinman engineer who wishes not to give his name said that the inspection, carried out in the summer of 1979, did reveal three or four broken suspender rods. Some thought was given to replacing the solid suspenders with the kind of wire rope suspenders used elsewhere on the bridge. But that, he said, would allow the structure too much flex. What's being done instead is to replace the existing slip joints, or trunnions—which permit only longitudinal swing of the rods—with spherical bearings that can accommodate to motion in any direction.

Other rehabilitation measures are in store for the bridge, among them:

- The cable pit will be opened up to permit easier maintenance of the cable. Broken wires, in what the Steinman engineer terms "a delicate operation," will be replaced.
- The New York and Brooklyn towers will be protected with cofferdams.
- Wire rope suspenders and stays will be replaced.
- The bridge will get a paint job.

After that, said the Steinman man, the bridge may be good for another 100 years.

Maybe. Anthony Atheling, for one, is not so sanguine.

For years, Atheling worked mostly abroad—in Thailand, Brazil, Liberia, Saudi Arabia, and elsewhere—on big construction projects. He worked on harbors, bridges, roads. Then, he says, "I got tired of working overseas. I thought I would sort of redomesticate myself." So three years ago, he took a job as Acting Engineer-in-Charge in the Division of Bridge Operations of the City of New York's Department of Transportation, East River Bridges Section. His boss is Bob Gough. And while Gough is responsible for all the city's bridges, Atheling cares solely for the four big bridges, including the Brooklyn, that span the East River.

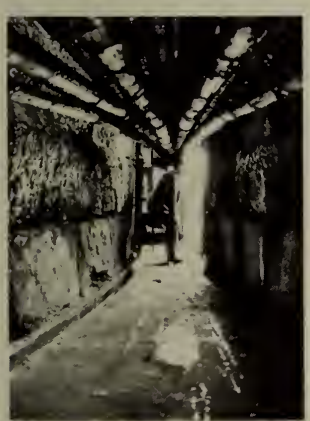
But now, at age 55, all he's looking for is the chance to get out.

He was born in Youngstown, Ohio, raised in Brooklyn. Brooklyn is where he is now, at 390 Kent Avenue, the home of East River Bridges; you can see three of them from his window, the Williamsburg looming just outside. He has brown, almost Oriental eyes, set deep into a gaunt, high cheekboned face. It is an unforgettable face, and right now it is angry. Over the telephone, he'd seemed merely tired, resigned. But seeing him in person, you realize his feelings go much deeper.

At first, he is coolly official. His job is to maintain the four East River bridges, he says, adding: "In theory." Because the fact is, he says reluctantly, his department has been reduced to "a reaction squad." His work force is "pretty well decimated. It used to be about 120, but I don't suppose there are more than 70 now." Now, all he and his thinned-out staff can do is react to citizen complaints as they arise. Regular maintenance of the bridges, any of the bridges, is out. "Now," he says, "we're not much more than janitors."

Yes, he admits, the city has been faced with the most serious budget crisis in its crisis-ridden history, with every department forced to endure brutal cuts. But don't they realize, he asks, that while "you're saving maintenance dollars, sooner or later you have to make it up with a capital outlay?"

But money and manpower are not the whole problem. There is a crisis of morale. Bureaucratic and political factors



Above, the limestone-lined cable pit, where the cable's 19 strands of galvanized steel wire are anchored. At right, the Bridge is dwarfed by the Manhattan skyline. A hundred years ago, only the spire of the old Trinity Church loomed over the bridge's 276-foot towers.

make it impossible, he claims, for his men to do their jobs. An organizational reshuffling some years back pulled Bridges out of Public Works and into Highways—which is run, he says with thinly veiled contempt, by mere "laborers." Taking care of a complex structure like a bridge, John Roebling's or any other, demands electricians, oilers, carpenters—skilled craftsmen. But in the new set-up, Atheling says, he's got master carpenters who have to report to people who are little more than pothole fillers risen up through the ranks. "They don't know a freaking thing about bridges!" It leaves his men angry, demoralized. One of them, in the office while Atheling is talking, nods his head in agreement.

Suddenly, on May 24, 1883, Brooklyn was just a five-minute train ride away. But even in 1925 shown here, the ferries still ran.

Why, he can't so much as order the logbooks his foremen need, he laments—though they form part of his department's legal record; they were deleted from his budget request. Loose slats on the Brooklyn Bridge promenade went undetected, he'd written in an intradepartmental memo just a few days before, "because of endless diversion of the East River Bridges carpenters to non-bridge work, such as . . . remodeling of 40 Worth Street offices and erecting of temporary fencing around an archeological 'dig.' " Oh, and what about that wire rope stay that snapped a while back, killing a Japanese photographer? "Nobody is accountable!"

He wants to do his job, Atheling insists, "but I have neither the people nor the equipment to do it." He shuffles amongst his papers for a memo he'd written a couple of years before, complaining that his department was having trouble gaining access to basic machine shop equipment traditionally under its jurisdiction. "If the City-organized bridges maintenance section is not to be provided with such easily accessible machine shop facilities," he'd written at the time, "then the time might have arrived, at last, for the city to sell the Brooklyn Bridge to someone who can properly care for it."

He looks up, angrily: "The administrators make the decisions here, not the engineers, not the craftsmen . . . What suits them in their management is what decides the lifeblood of the whole freaking city . . . The engineers are handcuffed."

But 1883 was a different age. It was the age of the engineer. It was a time when, as David McCullough has written, to Americans "a bridge seemed such a magnificent example of man's capacity to master the forces of nature . . . Building a bridge seemed such a clean, heroic thing for a man to do."

The day after John Roebling's funeral in 1869, the Brooklyn *Eagle* commented: "The great boast of this land is twofold—the political works of the [Founding] Fathers, and the material triumphs of science, of which Roebling was, with scarcely any exception, the greatest hero . . . One such life as Roebling's was worth more than those of a whole convention full of jabbering and wrangling politicians."

John Roebling was the kind of man who, when he came over on the boat from Germany, was up early every morning, learning "the name of every sail, every stay, brace, bowline, halyard, every rope and how each one worked. And he made diagrams to be sure he understood." That was how David McCullough saw him revealed in his diary of the voyage. He was the kind of man for whom, as his son would write after his death, "the question . . . was never how to do a thing, but which method to select of the number that occurred to him . . . The originality of his mind was such as to forbid it from imitating even itself." He was a dreamer, a thinker, a builder, a doer.

Not that he was an innocent. He knew how power worked. He'd managed to make plenty of money. And he knew how to sell. Indeed, he was the first person to "sell" the Brooklyn Bridge.

In his 1867 proposal, he appealed to the innate conservativeness of businessmen skeptical of a potentially risky engineering feat: The cable cars he planned to run across the bridge represented a technology "perfectly simple and perfectly well understood. There is no novel feature and no experiment involved in this arrangement." He appealed to their ideals. He appealed to their imaginations. He appealed to their pocketbooks. The ferries then plying the East River between Brooklyn and New York would be placed in financial jeopardy by the bridge? Not at all, he said, there'd be plenty of business for everybody. The bridge would "not set up a dangerous rivalry to the existing Ferry interest." Rather, it would create business. Even aesthetic, or what we'd call today urban renewal, concerns did not escape his attention. "This work will greatly beautify and improve [the area around the New York terminal] which appears to need it more than any other."

It was a model of high-minded salesmanship, at once practical, thorough, confident, technically imaginative, and frankly commercial. It was a sales proposal, yes. But it was the sales proposal of a visionary, a man of values and ideals, rather than that of a door-to-door salesman. There is a powerful imagination at work in it, one single-mindedly intent on having other eyes see what his did, other minds grasp his vision.

And the fact is, he was *right* in his promises and predictions, over and over again. The cable cars worked fine. The ferries did indeed prosper; the last of them wasn't withdrawn from service until 1942. He predicted New York would overtake London and Liverpool as a commercial center. And it did. He said tunnels would one day be sunk under the East River. And they were.

"The contemplated Work, when constructed in accordance with my designs, will not only be the greatest Bridge in existence, but it will be the great Engineering Work of this Continent & of the Age." And it was.

Jackson L. Durkee, '43: His Cables Bridge the World

"At company meetings and public hearings, I'm what's known as the *elbow man*. When someone turns to the guy at his elbow for counsel on a sticky technical question, I'm that guy."

As a consulting structural engineer, Jackson L. Durkee, '43 CE, '51 PCE, has served as elbow man scores of times, from hearings on the Kansas City Hyatt Regency Hotel skywalk failure, to the current rehabilitation of New York City's four East River bridges, including the century-old Brooklyn Bridge.

In public works projects, he says, it's common to bring in experts to advise on technical questions. In the case of the NYC bridge rehabilitation, he counsels the NYC Department of Transportation, reviewing the feasibility studies, tests, specifications and reports of the bridge rehabilitation engineers and contractors.

"Engineering decisions," he says, "are not always cut-and-dried. For example, three consulting engineers will render three distinct opinions on a given question. All this is quite legitimate and necessary." After all, he adds, when your dentist recommends bridgework (the pun was irresistible), you'd be wise to get the opinions of a couple of other specialists before proceeding.

Normally, consultants' reputations are decades in the making. Durkee's 28 years as chief construction engineer at Bethlehem Steel, the last ten of them as chief bridge engineer, and his participation on many of the world's most ambitious construction projects are why his counsel is today in such great demand. He has been "totally immersed" in seven suspension and scores of other bridge projects, including the Tacoma Narrows Bridge second span, Philadelphia's Walt Whitman Bridge, Florida's Sunshine Skyway, and the gargantuan maintenance hangars at Jan Smuts airport in Johannesburg. He is also consulting on the projected Messina Strait suspension bridge linking the Italian mainland with Sicily. "Under consideration for more than 20 years," he reports, "the Messina project—consisting of a single span of 10,827 feet, and 1,250-foot towers to be built on earthquake-prone strata—is my greatest challenge to date."

The 1982 winner of ASCE's gold medal for structural engineering.

But Durkee is best known for developing and applying a revolutionary suspension-bridge cable system that uses parallel-wire strands (PWS) rather than the traditional helical configuration. In fact, lifelong advancement of bridge design and his PWS breakthrough have won him the 1982 Earnest E. Howard Award, the gold medal of structural engineering, which is given by the American Society of Civil Engineers (ASCE). In winning the Howard, Durkee joins a host of distinguished bridge designers, including David Steinman and O.H. Ammann. "I feel outclassed by the past recipients," he says, adding, "but I decided not to turn down the award."

It was in 1959, while standing atop a bridge tower, gazing at a suspension cable, that Durkee had the idea of making strands having parallel (rather than helical) alignment for use in construction of suspension-bridge cables.

This—a breakthrough? Certainly, when you consider that the strength-to-mass characteristics of PWS cable are considerably greater than in helical-strand cables. PWS cables also combine the erection advantages of helical-strand with the superior in-place characteristics of parallel-wire cables. Developed in the late 1960s, PWS cable suddenly rendered obsolescent the traditional "aerial spinning" method of bridge cable construction developed 125 years earlier by John Roebling, designer of the Brooklyn and other bridges of the day.

Completed in 1969, the Newport (RI) Bridge was the first suspension bridge to use Durkee's PWS cables. Others followed; for example, the second Chesapeake Bay Bridge and the many-spanned suspension bridges of Japan's vast Honshu-Shikoku crossing project.

In spite of his global reputation, Durkee's consulting engineering firm is a one-man show run from his home in Bethlehem, PA. Naturally, he calls upon specialty sub-consultants as his commissions dictate. "It keeps the perspective fresh," he says.

"Engineering is not merely grinding numbers and coming up with textbook answers to physical problems." More important, he contends, "—and far more difficult—we must apply our accumulated judgment to the practical implementation of these numerical solutions."

Though he recently turned 60, Durkee believes his best years lie ahead. "I'm shooting to be a scratch golfer, for one thing." (When his work takes him to the British Isles, he plays the famous Old Course at St. Andrews, Scotland.) Career-wise, until now, he says with characteristic understatement, " 'the past is prologue.' The next 20 years should be a bit more productive."

Durkee's '43 classmates will be back on campus in force for their 40th reunion June 2–5. ASCE's gold medal winner plans to be among them. Says he, "Save me a seat!"

WPI CLASS NOTES

WPI Alumni Association
President, Peter H. Horstmann, '55
Senior Vice President,
Harry W. Tenney, Jr., '56
Vice President,
Donald E. Ross, '54
Secretary-Treasurer,
Stephen J. Hebert, '66
Past President, John H. McCabe, '68

Executive Committee
members-at-large
Henry P. Allessio, '61; Philip B. Ryan, '65; John M. McHugh, '56; Anson C. Fyler, '45.

Fund Board
Henry Styskal, Jr., '50, chair; Richard B. Kennedy, '65, vice chair; Gerald Finkle, '57; Allen H. Levesque, '59; Philip H. Puddington, '59; Richard A. Davis, '53; C. John Lindegren, '39; John M. Tracy, '52.

1923

Reunion **June 2–5, 1983**

1926

"**Hap**" **Wendin** writes, "We have just returned from a seven-week cruise to Micronesia and have settled down to another winter program of playing and directing duplicate bridge, the lapidary shop and Spanish classes." During the past year, he has talked with **Phil Delphos, Armand Paquette** and **Chandler Jones** and has spent a few days with **Ken Archibald.**

1928

Reunion **June 2–5, 1983**

1930

Last summer Betty and '**Gene Center** took the overnight ferry from Portland, ME, to Yarmouth, Nova Scotia. They then traveled along the Fundy coast to Halifax and followed the "beautiful Cabot Trail." Other highlights were visits to Baddeck and the Alexander Graham Bell museum, old Fort Louisbourg, New Brunswick-Moncton and St. John.

1933

Reunion **June 2–5, 1983**

1935

Al Cantor retired from the heavy construction industry in the fall of 1981, only to become active in it again in June of 1982. For 45 years he has supervised the construction of bridges, piers, dry docks and dredging.

Austin Coates reports that just prior to his retirement from Heald Machine, Worcester, he worked on a project involving the shaping of the ball joint for hip replacements.

Jack Healy continues as president of the Newburyport (MA) Maritime Society. Recently he retired as senior engineer from Liberty Mutual Insurance Company and now does some consulting as a registered professional engineer. Last spring, the Healys and the **Fred Swans** took a jungle cruise up the Orinoco River in Venezuela.

Vern Olson writes that he plans to attend the 50th reunion in 1985. Now retired from Du Pont, he enjoys travel, singing in the church choir and working with the United Way, as well as golf and fishing.

Ray Starrett and his wife, Barbara, after going the RV route throughout the U.S., are now considering selling their motor home. They have retired to Florida, but spend the summers in North Conway, NH.

Homer Morrison, Class Secretary

1936

A spring tour of England, Scotland and Ireland was enjoyed by the **James Ethiers** last year, as well as a fall U.S. auto trip on the new highway through the Cascades National Park.

Scott Goodwin and his wife do volunteer work one day each week at a nursing home in Hartford, CT. Scott has also been helping his son-in-law build a garage and office addition to his home.

Last June the **Ed Guilds** attended his 50th high school reunion in Amesbury, MA. They recently visited their daughter in New Jersey and took a trip to Las Vegas. Ed still takes part-time assignments at Reynolds Metals.

The **Hamilton Gurnhams** have been enjoying their self-contained motor home while on an extended 15,000-mile trip through 34 states and 5 Canadian provinces. Last fall they spent a week in Myrtle Beach, SC, with **Harry Anderson, Perry Clark** and **Harold Whitman.** They also got together with **Richard Merriam** and **Leonard Humphrey, '35,** and **Herbert Gale, '34.**

Harold F. Henrickson, Class Secretary

1938

Reunion **June 2–5, 1983**

Currently, **Werner Held** teaches math part time at the University of Montana.

Albert Kullas, who recently retired from Martin Marietta Corp., now has his own consulting firm. He offers service in general management, systems engineering and computer applications.

Now on the road to recovery following open-heart surgery, **A. George Mallis** does some consulting work and remains active in the field of numismatics. His book concerning the Morgan and Peace dollars of the United States has sold more than 15,000 copies and is the standard reference on the subject.

Malcolm Safford and his wife, Hazel, enjoy trailer travel. Last year they went to the World's Fair in Knoxville and on to Mark Twain country in Hannibal, MO, and to the Kentucky Horse Park in Lexington.

The **Bob Tafts** are still living in Naples, FL, where they play golf about four times a week.

Francis Witkege writes that he is learning to play the piano and hopes to "get into some creative writing."

Walter E. Knapp, Class Secretary

1940

Bob Hewey is now fully retired as vice president from Sprague Meter Division of Textron, Inc. He writes: "My principal outside interest is with the Service Corps of Retired Executives (SCORE), a branch of the Small Business Administration."

1943

Reunion **June 2–5, 1983**

1944

David Field has retired from Boeing Vertol Co., Philadelphia.

Everett Johnson has been named as an associate director of Petroleum Research in Texaco's newly restructured Research, Environment and Safety Department in Beacon, NY. After holding research, administration and

managerial positions with the firm, he was appointed manager of the Beacon Research Laboratories in 1978.

1945

Paul Craig, Jr., is an attorney and general partner with Craig and Burns in Washington, DC.

1946

John Laffey was recently appointed president of Fairchild, Incorporated. Located in Beckley, WV, it is the world's largest independently owned mining equipment manufacturer. Formerly he was vice president of major-accounts marketing and vice president and general manager of Austin Western Machinery Company, a subsidiary of Clark Equipment Company. He holds a graduate degree in economics and business administration from Clark University and has completed courses in advanced management.

1948

Reunion **June 2–5, 1983**

1952

MARRIED: George Whittle to Dana Reardon recently in Cohasset, MA. She graduated from New Hampshire College and is a free-lance nurse. He is president of Whittle Associates.

Bernard Brennan is a field service supervisor for United Technologies-Hamilton Standard in Windsor Locks, CT.

1953

Reunion **June 2–5, 1983**

Thomas O'Connor, coordinator of engineering at Central New England College, Worcester, has been appointed a member of the Worcester Conservation Commission. He has a master's degree from Worcester State College and is a member of the Salisbury Pond Task Force and the Advisory Committee on Lead Paint-Rodent Control.

1954

Dr. **Richard Lindquist** is now chairman of the department of physics at Wesleyan University, Middletown, CT.

1956

Jack McHugh was recently elected chairman of the Higher Education Center Advisory Committee in Waterbury, CT. He is president of his own firm, the Royal Screw Machine Products Co., in Waterbury, and is a past president of the local Smaller Business Manufacturers Association and the Exchange Club.

John Rogers continues as a senior technical specialist at Du Pont in Wilmington, DE.

1958

Reunion **June 2–5, 1983**

Prof. **James Demetry** of WPI's electrical engineering department has been elected to the administrative committee of the IEEE Society on Social Implications of Technology, a new IEEE professional group. Serving with him on the committee is former WPI president Arthur Bronwell.

Robert Donegan serves as office manager for Argo Systems in Greenbelt, MD.

Ronald Kangas spoke on "Alternatives to the Traditional Mass Transit Systems" at WPI's ME Colloquium in November. He is acting chief of the Design Division, Systems Engineering, of the U.S. Department of Transportation in Washington, DC.

Multibank Financial Corp. has named **Joaquim Ribeiro** to its corporate board. He is director of the firm's affiliate, Mechanics Bank, in Worcester. Also, he serves as vice president for Jamesbury Corp., Worcester. Ribeiro, who graduated from the advanced management program of the Harvard Business School, holds an MBA from Clark University.

1960

Cdr. **Kevin Burke** recently retired after 20 years of service with the Navy. Currently he resides in Arlington, VA.

Roger La Fontaine is employed as a sales application engineer at Powercube Corporation, Billerica, MA.

Alfred Materas, Jr., is now director of organization development for the Paul Revere Companies in Worcester.

1962

Adrien Berthiaume has been appointed a full-time instructor of engineering and technical studies at Northern Essex Community College, Haverhill, MA, where he has served part time

Maggiacomo Tapped By Two Halls of Fame

Often the crowning achievement of an athlete's career is induction into a hall of fame. Last fall, Antonio ("Jock") Maggiacomo, '32, of Cranston, RI, was inducted into two! Not only was he tapped for the Cranston Hall of Fame, but he was also named to the Providence Gridiron Hall of Fame.

Jock Maggiacomo has earned his laurels. As head football line coach at Cranston High School from 1936 to 1953, he helped his team win seven divisional titles and three state championships. The baseball team he coached for 16 years at Cranston High won four state championships.

A founder and treasurer of the People to People Sports Committee of Rhode Island, he has directed the activities of two groups of Rhode Island young people in several Latin American countries. Two years ago, Maggiacomo was designated by former president Ford as "Sports Ambassador" of the U.S. in appreciation of his 20 years of participation in international sports competition, contributing to international friendship, goodwill and understanding through sports.

A faculty member at Cranston High School East for 25 years and science department chairman at Cranston West for six years, Maggiacomo holds a master's degree in education from Rhode Island College. From 1936 to 1978 he was treasurer and vice president of the Greater Providence Deposit and Trust (including 12 years in active service after he had retired from the Cranston school system).

Hall of Fame president honors Maggiacomo (right).

He also has been active in community affairs, serving with the Cranston Mental Health Association, the Cranston Brotherhood Committee, the Cranston Rotary and the American Cancer Society.

During the hall of fame induction ceremonies, Maggiacomo was cited as being "respected and admired by all as an exemplar of the scholar-athlete, who has also had a distinguished business career."

since 1980. Previously he taught at St. John's Preparatory School in Danvers and Central New England College. For two years he was with Sylvania Electronics. Currently he is completing his MSEE at the University of Lowell.

Jackie Matteus is a senior staff administrator for Perkin-Elmer Corp., Wilton, CT.

William Shepherd is sales manager at Landart Systems, Inc., New York City.

1963

Reunion **June 2–5, 1983**

Now on a seven-month sabbatical from Dartmouth's Thayer School of Engineering, **Francis Kennedy, Jr.,** is spending nearly five months as a visiting research professor at Insa, Lyon, France, after which he and his family will go to Bangkok, Thailand, where he will be a visiting faculty member at the Asian Institute of Technology.

Robert Kostka is a department head at Eastman Gelatine Corp., Peabody, MA.

A. Edward Scherer, who has been elected supreme master of Alpha Epsilon Pi fraternity for 1982–83, is the first supreme master from the fraternity's WPI chapter, Epsilon Deuteron. He has been regional governor for New England, president of the Hartford Alumni Club and dean of the 1974 Leadership School. The director of nuclear licensing for Combustion Engineering in Connecticut, Scherer is a registered professional engineer in Massachusetts and holds an MBA from the RPI Hartford Graduate Center.

1964

Joe Brinkmann recently accepted a post as a senior engineer in microelectronics materials at Norden Systems in Norwalk, CT.

David McCaffrey continues as an account executive at Union Carbide Corp., Chicago. The McCaffreys have a one-year-old son, Andrew.

1965

Michael Boyd is a self-employed software engineering consultant in Seattle, WA.

For more than a year, **Tolga Cubukcu** has been working for Smislova, Kehnemui and Associates, an engineering company which mainly designs office buildings in the metropolitan Washington DC area. He is currently project manager for the renovation of the old National Press Building in downtown Washington.

Charles Dufour holds the post of director of engineering for the Newspaper Press Division oa Harris Corp. Dover, NH. His job recently took him to India and Australia.

Dave Geiger is now manager of labor relations-personnel for the Torrington, CT, plants of the Torrington Company. Formerly he was manufacturing manager.

Jay Hammett recently left EMC Controls and started his own company, the Entré Computer Center, in Timonium, MD. So far his main lines are IBM and Televideo, although he expects to take on additional lines.

His Camera Captures The Beauty of Nature

Award-winning photographer Lincoln Nutting, '43, of Grand Island, NY, is for the birds—for the flowers and for the environment.

An accomplished naturalist as well as photographer, Nutting knows how to capture the heart of Mother Nature. *The Buffalo News Magazine* found his brilliant spring flower photos so realistic that it ran a three-page spread. And the publishers of *Wildflowers of Eastern America* (Galahad Books, New York City, 1981) selected his wildflower photographs for their book jackets.

How did a former chemist with Hooker Chemical Company get so involved with flora and fauna? Says Linc, "Nature study and photography have been part of my life since I was a boy. When I retired in 1970, it seemed logical to develop my other talents."

Nutting has developed his outside interests into a fine art. Photo Researchers, a company which sells slides to publishers, holds 600 of his nature slides. To date, his biggest artistic-commercial success has been a slide of a puffin taken on Machias Seal Island, ME.

Besides participating in winter bird counts and nature tours, Linc has photographed bats in an abandoned mine, has made a publicity film for the Tifft Farm Nature Preserve and has given illustrated nature talks to garden clubs, Scouts and school groups. Last summer he entered a photo entitled "Two Bridges" in the Grand Island Art Society Exhibition. It took first prize.

Getting ready to shoot.

Linc is active in many nature, ornithological and conservation groups in the Buffalo area. "My wife, Barbara, shares my interests," he reports. "We have served as co-directors of Audubon Wildlife Films. Recently she helped me gather material for the Lillian Fairchild Travel Talks."

Daughter Mary Lyn appears to have inherited at least one of Dad's talents. She is majoring in art at Mt. Holyoke College.

Peter Kirschmann has been named manager of the bushing and arrestor products section of GE's large power transformer business in Pittsfield, MA. Formerly he ran the power transformer product section for Canadian General Electric. He has an MBA from Syracuse University.

Tad Kucera is a manager for GE in Medford, MA.

Pat Moran writes that he runs 1,500 miles a year and collects "worn pairs of running shoes." His daughters both played soccer last fall while Dad coached. His wife, Mimi, has her own silkscreening business, is a part-time teacher, and is active in community projects.

Dick Olson continues with National Development Corporation in Bradenton, FL, a firm which develops and constructs condominiums and single-family lots.

Tom Pease and his wife, Gail, are active barbershop singers. Still with Lawler, Matusky & Skelly Engineers, Pearl River, NY, Pease does oceanographic and groundwater studies.

John P. Jacobson, Class Secretary

1967

Richard Court, Jr., serves as manager of quality control services at Boehringer Ingelheim, Ridgefield, CT.

Dr. **George Kasper** has been appointed development supervisor of Kodak's electrographic technology division in Rochester, NY.

Leonard Odell has been elected a vice president at the Hartford Insurance Group where he directs individual life and health actuarial, sales administration and underwriting operations. He joined the firm in 1973 as associate actuary, advanced to actuary in 1976 and was named assistant vice president in 1980.

Ray Rogers shares a letter he directed to **Dusty Klauber:** "I would like to convey my thanks and also pass on the appreciation expressed by our classmates on the fantastic job you did as the 'reunion czar.' It was a well organized, orchestrated good time. The large turnout was a real tribute to your efforts, Maureen's indulgence and recognition of the high esteem in which you are held by our classmates."

1968

Reunion
New Date **October 1st, 1983**

BORN: to Catherine and **Scott Wilson** their first child, Rachel Elizabeth, on June 2, 1982. Last February Wilson took the post of sanitary engineer at Andrews AFB, Washington, DC.

Neil Durkee has been named director of planning and administration for Norton Company's coated abrasive division. With the firm since 1974, most recently he was materials manager. He has an MBA from Harvard Business School.

1969

Alan Cunningham serves as a teaching assistant in the computer and information science department at Temple University in Philadelphia.

Peter Heins continues as a Boeing 727 pilot for Eastern Airlines. Recently he became the executive officer of the U.S. Coast Guard Aviation Reserve Unit in Miami, FL. "Our reserve pilots and 30 enlisted men augment the active-duty air station as pilots and mechanics for their HH-52 Sikorsky rescue helicopters and HU-25A Falcon medium-range search airplanes."

Recently **Henry McGuire, Jr.,** was named program manager for applied technology and strategic planning for the waste management program at Rockwell Hanford Operations in Richland, WA. Previously he had held management positions in engineering technology, environmental engineering and low-level waste technology at Rockwell. He has a master's degree from Loyola University of Los Angeles.

1971

MARRIED: Francis Scricco and Ivy Coffman in Bethlehem, PA, on November 13, 1982. She graduated from Cedar Crest College, Allentown, PA. Scricco, who received his MS with distinction from Columbia University Graduate School of Business, is general manager of GE's room airconditioner department in Louisville, KY.

BORN: to Pat and **Leo R. Gillis, Jr.,** a son, Brian James, on October 11, 1982. Brian has a brother Kevin, 3. Leo is with New England Power Service Co., Westboro, MA.

Ashok Badjatiya has established Jai Kisan, Agro Products, an animal-feed manufacturing unit at Indore, India.

Robert Childs has been appointed industrial sales manager at Riley Stoker Corp. of Worcester. With the firm since 1971, he was sales engineer and later district manager of the company's Portland, OR, office. He has both a BS and an MS from WPI.

Michael Turek is product manager at Fisher Controls International in Marshalltown, IA.

1972

MARRIED: Anthony B. Longo to Anita M. Willow in Woodmont, CT, on October 30, 1982. She graduated from East High School and is a secretary with Consolidated Controls Corp., Bethel, CT, where he is an electrical engineer.

Dwight Allen serves as vice president of Cambridge Technology, Inc.

Douglas Best is now a corporate manufacturing engineer at Jamesbury Corporation.

Alan Dion is an environmental engineer for the U.S. EPA in Boston.

Gary Dunkleberger is a technical support manager for Gesco Corporation, Fresno, CA.

Theodore Martin, Jr., serves as a senior process engineer at MacDermid, Inc., in Waterbury, CT.

Loren Smith is a lecturer at the University of Hawaii.

Richard Sojka, director of engineering at Clairol's manufacturing facility in Stamford, CT, served as a member of the Placement Seminar Panel at WPI in November.

Last fall **Donald Taft** was elected a vice president of Courier Corporation, Lowell, MA. He was also named general manager of Courier's Forms East Division, which employs 750 and has sales of $37 million.

1973

Reunion
New Date October 1st, 1983

MARRIED: John W. Barry to Patricia A. Latus in Poughkeepsie, NY. Both are employed by IBM. She received her computer science degree from Cornell. . . . **Scott R. Blackney** to Edith F. Chadwick on October 2, 1982, in Westboro, MA. A graduate of Bentley College, she is with Data General Corp., Westboro. He works for Raytheon in Wayland.

John Albini is a distribution planning engineer at United Illuminating, New Haven, CT.

Terrence Luddy has been promoted to senior engineer in the capacity planning department of Northeast Utilities in Connecticut. With the firm since 1973, he has held increasingly responsible posts with the civil engineering, internal auditing and capacity planning departments. He has a JD degree from Western New England College of Law and is a member of the Connecticut and American Bar Associations, as well as of the ASCE.

Joseph Osgood is a senior software engineer for Puritan-Bennett Corporation, Los Angeles.

Kenneth Puls, employed in the aerospace division of Ensign-Bickford Company in Simsbury, CT, has received an MS in engineering management from Western New England College.

1974

BORN: to Mr. and Mrs. **Leonard Brzozowski** a son, Michael. Len is now manager for the Standard Atmosphere furnace business in the Surface Division of Midland-Ross Corporation. He and his family reside in Toledo, OH. . . . to Nancy and **Larry Patty** their first child, a son, Dean Nicolas, on February 26, 1982. Larry, who holds an MBA from the University of New Haven, is now in a new department at Electric Boat: Reactor Plant Services.

Dennis Anctil is a project engineer for Costello, Lomasney & deNapoli, Inc., Manchester, NH.

Barbara Bain was a member of the WPI Placement Seminar Panel last November. She is a division manager for Southern New England Telephone.

Paul ("Butch") **Boulier** is a project leader in the development group at the thermoplastics division of Borden Chemical in Leominster, MA. He is studying for his master's degree in plastics engineering at the University of Lowell.

Daniel Brunell has been named vice president and general manager of Pro Sol Corp., sporting goods subsidiary of Louis Lefkowitz and Brother, Inc., Milltown, NJ. Brunell, with Lefkowitz since 1974, says that Pro Sol is the leading manufacturer of leather tennis grips worldwide.

Bob Bryant works for the power department of the New York City Transit Authority.

Last September, Capt. **Chris Cigal** completed his studies at Combined Arms & Services Staff School at Ft. Leavenworth, KS.

Dave Demers, a professional engineer, is president of his own fire protection engineering consulting firm, Demers Associates, in Lunenburg, MA. He is also a lieutenant with the Lunenburg Fire Department.

Bob Dutson serves as a senior property loss control consultant with Johnson and Higgins on Wall Street in New York City. Previously he was with the Kenyser Group in Summit, NJ.

Tom Frink has just enrolled in the master's program for philosophy at Boston College and hopes to go on to a graduate degree in theology.

Dave Gerth is with the Corporate Finance Group at Computervision Corporation in Bedford, MA. "Really enjoy the job and people. Work a lot with our European and Far East Division."

Vijay Kirloskar currently serves as executive of operations for Kirloskar Electric Company Ltd, in Bangalore, India.

Skip Leanna is project construction manager for East Kentucky Power of Winchester, KY. He says he has been infected by the "horse bug" and is developing a farm for the breeding and training of Arabian horses.

Dr. **Ted Ledden** continues as a dentist in Wilmington, DE. Recently he was the individual squash champion for the "C" level in the Philadelphia area. His club team won the "C" level league championship.

George Lewis is now manager for transducer products at Irex Corporation, Ramsey, NJ. Earlier he was with Seimens GammaSonics in Santa Clara, CA, and G.D. Searle Co. in Des Plaines, IL. Hobbies include woodworking, swimming and breeding Samoyed dogs.

John Lord is involved with inside sales of rotating equipment for Terry Steam Turbine, a division of Ingersoll-Rand in Windsor, CT. His wife, **Michelle Riel Lord,** keeps busy raising their two sons and running a macrame business.

Gene Lukianov continues as product engineering manager at Gabriel of Canada in Ingersoll, Ontario. He still races cars.

John Martin and his wife, April, are both active in the National Ski Patrol, primarily at Mt. Tom and Berkshire East in Massachusetts. John, a professional engineer, serves as project engineering supervisor in the plant engineering department at Monsanto in Springfield.

John Mason was recently elected vice chairman and program chairman for the northeastern section of the American Nuclear Society. A professional engineer, he holds a new post involving mechanical engineering support for changes and retrofits on USAF AWACS planes at MITRE Corporation.

Jerry Masi is president of Eric Bruckner & Company, a real-estate investment firm in Santa Barbara, CA.

Dick Miles has been promoted to senior staff systems programmer at AVCO Computer Services in Wilmington, MA.

Currently **Dave Packard** is a staff design engineer with Public Service Company of New Hampshire in Manchester. He and his wife, Patricia, have a son, Brian David, born in January 1981.

Neil ("Pugs") **Poulin** is a semiconductor process engineering manager at IBM in Essex Junction, VT, and does a lot of company travel. In his spare time, he bicycles some 3,000 miles a year. He and Rachel have a baby son, Adam, and are building a new home.

George Ranney is a process engineer at UniRoyal Chemical Division in Baton Rouge, LA. Active in their church, the Ranneys belong to a swimming and tennis club. He coaches a diving team in the summer.

Jim ("Bino") **Rubino,** who has been with Torrington Company since graduation, is now district manager of barring sales in South Bend, IN. He and his wife, "Weezie," enjoy golf, racketball and softball.

Lee Turner has accepted a post with his old company, Baxter Travenol Labs, in Chicago, after working in Miami for nearly four years.

Craig Tyler serves as a sales engineer for Times Fiber Communications, Wallingford, CT. He is responsible for the nationwide sales of bulk coaxial cables to the firm's military customers.

Mary Lynch Voshell is now a registered professional engineer and plans to return to engineering soon. She has a three-year-old daughter at home.

John Young is with Procter & Gamble in Belgium.

Richard Zarr holds the post of senior associate engineer at IBM in Endicott, NY.

Jim Rubino, Class Secretary

1975

MARRIED: Harry F. Danberg and Stephanie Ann Heyman in Metairie, LA, on November 28, 1982. She graduated from Loyola University. . . . **Gary LaLiberty** to Deborah Jacobs in Niagara Falls, NY, on November 6, 1982. She graduated from Niagara County Community College. LaLiberty is with Occidental Chemical Co., Niagara Falls. . . . **David P. Samara** and Holly A. Wellstead in Somersworth, PA. Both are employed at Westinghouse in Pittsburgh. A graduate of Ohio University, she is with the corporate human-resources department. He is a salesman in the nuclear service integration division.

BORN: to **Bill DiBenedetto** and Molly Latham a daughter, Yvonne, on August 8, 1982. Bill is currently the Federal Communications Commission program manager of the Systems Division at Digital Equipment Corporation in Chelmsford, MA. . . . to Mr. and Mrs. **David Kingsbury** their fourth child, Daniel Edgar, on October 24, 1982. (The baby's aunt is **Mary Beth Chuplis, '86.**) Dave is a systems specialist with Monsanto in Bloomfield, CT.

Nick Baker, Fred Cordella and **Mark Cosenza** were members of the Placement Seminar Panel held at WPI in November. Nick is with Data General, Fred with the Badger Company and Mark with Polaroid.

> The annual meeting of the WPI Alumni Association will be held on Saturday, June 4, 1983, in Harrington Auditorium on the WPI campus at 1:00 PM.

Kent Berwick had been promoted to captain in the U.S. Air Force Reserve. He is assigned with the 337th Tactical Airlift Squadron at Westover Air Force Base, MA.

William Booth of the Boston law firm of Fish and Richardson spoke on "Patent and Invention Related Law and How it Affects the Engineer and Scientist" at WPI in December.

Scott Wilson is with Hughes Aircraft in Tucson, AZ.

1976

MARRIED: Richard M. Cheever to Mary E. Meehan in Belmont, MA. A graduate of UMass, Amherst, she has an MBA from Boston University and is now with Digital Equipment Corporation, where he is also employed. Cheever has an MBA from Babson.

James Buss has been promoted to assistant actuary at State Mutual in Worcester. He joined the company in 1976 and had been a senior actuarial associate since 1980.

Bruce Doan is chief engineer and technical director for WCUW Radio, Worcester.

John Forster is a student at Harvard Business School.

Barry Siff, who recently received his master's degree from Wayne State University, Detroit, now works for Colonial Provision Co., Boston.

Brian Swanson is a senior research engineer at Norton Co., Worcester.

1977

MARRIED: Stephen M. Coleman and Doreen A. Calcagni on July 24, 1982, in Worcester. She graduated from Burncoat Senior High School and is employed at State Mutual Life Assurance Co., Worcester, where Coleman is a senior actuarial associate. . . . **Mark E. Watson** and Linda A. Lapriore on June 5, 1982, in Worcester. A supervisor for Friendly Ice Cream Stores, Worcester, she graduated from North High School. He holds the post of project engineer at CPC Engineering Co., Sturbridge.

Steven Ciavarini is a system engineer at the Foxboro (MA) Co.

Marc DeVoe serves as a systems engineer at IBM in Princeton, NJ.

George Harding III passed his Massachusetts bar exam and was admitted to practice in December. Last June he received his JD, cum laude, from Suffolk University Law School.

Walt Peterson is now an engineering section leader for ITT Grinnell in Huntington Beach, CA. He and Debra live in Santa Ana.

Theodore Pytel, Jr., is regional superintendent for meter and test at Niagara Mohawk Power Corp. in New Hartford, NY.

1978

Reunion
New Date October 1st, 1983

MARRIED: Gino J. Baroni and Cheryl L. Barnes on October 10, 1982, in Tewksbury, MA. She graduated from Katharine Gibbs School, Boston. A construction coordinator, Baroni is employed by Beacon Construction, Boston. . . . **Adrienne D. Dill** and David A. Schoenwolf in Short Hills, NJ, on October 9, 1982. She has a master's from Georgia Institute of Technology. Both are geotechnical engineers at Haley & Aldrich, Inc., Cambridge, MA. Schoenwolf holds two degrees in civil engineering from the University of Illinois. . . . **Alan W. Geishecker** to Alice G. Castro in Fort Knox, KY, on September 19, 1982. She graduated from Ajo (AZ) High School and works for the U.S. Army educational system. Geishecker is a U.S. Army captain stationed at Fort Knox. . . . **Richard Gottlieb** and Julia Clark in Springfield, MA, on October 11, 1982. She graduated from Becker Junior College and Katharine Gibbs School, Boston. He is employed by Perini Corp., Framingham, MA. . . . **Cynthia A. Gryniuk** and Randolph Hans Hofer in Waterbury, CT, on November 13, 1982. A mechanical engineer, Cynthia is an account executive for AT&T Long Lines, Stamford. He graduated from NYU with a BA in philosophy and a master's in business administration. He is a marketing specialist for GTE, Stamford.

Karen Chesney Honold served on WPI's Placement Seminar Panel in November. She is with AT&T Long Lines, Parsippany, NJ.

Dr. **Ethan Rosenberg** is a research chemist at C.P. Chemicals, Inc., Sewaren, NJ.

Margaret Staruk, who was advanced to senior systems analyst in 1980, was recently promoted to advisory communications consultant within the data communications organization at State Mutual in Worcester.

Andrew Tabak is with RCA in Burlington, MA.

Jeffrey Toran of Du Pont's photo products department wrote "Deposition of Titanium Nitride Coatings," which appeared in the September/October issue of Du Pont's *College Report.*

Wes Wheeler, who was recently married, has accepted a two-year assignment in Japan, starting in January of 1983. He will be a schedule control engineer on a $400-million Exxon project in Osaka.

1979

MARRIED: Lawrence J. Leduc and Karen Ann Carlson in Charlton, MA, on August 7, 1982. A graduate of Fitchburg State College, she is a special-education teacher. Leduc is a chemical engineer for American Hoechst of Leominster.

BORN: to **Karen Badger Wespi, '82,** and

George Wespi twin sons, Eric and Scott, on March 30, 1982. George is with F. W. Madigan, Co., Inc., Worcester.

Second Lt. **Paul Babin** is a graduate student at Texas Tech University in Lubbock.

Michael De LaCruz is principal engineer for robotics at Digital Equipment Corp., Andover, MA.

Egisto Minardi is with Texas Instruments in Houston.

Russell Murray, Jr., serves as a structural engineer at Stone & Webster, Boston.

Phillip Roux is a senior engineer at Data General Corp., Westboro, MA.

1980

MARRIED: Serge Molinari and Cynthia F. Boudreaux of Ponchatoula, LA, on August 14, 1982. They reside in Beaumont, TX, and work for Du Pont. She is a systems analyst and he is a power consultant for the Gulf Coast. . . . **William A. Murtha** and Kathy M. Latino in Liverpool, NY, on October 9, 1982. A student at State University College of Utica-Rome, she graduated from Cayuga County Community College and is a tax and insurance clerk with GE in Syracuse. He recently completed GE's Manufacturing Management Program. . . . Lt. **Robert P. Vozzola** and Diane M. Hutchinson on October 23, 1982, in Windsor Locks, CT. She is a graduate of the Jordan Hill College of Education, Glasgow, Scotland. Vozzola is stationed with the U.S. Air Force at Langley Air Force Base, Hampton, VA. . . . **Robert E. Yule** and Elizabeth H. Coffin on October 9, 1982, in Livingston, NJ. A former assistant display manager for Bamberger's in Rockaway, she graduated from West Virginia University. He is a chemical engineer with Du Pont in Belle, WV.

Verne Backus is an advanced technology engineer for GE in Waterford, NY.

Virginia Bastable, a mathematics teacher at Amherst (MA) Regional High School, has been selected a merit-award winner by the regional school committee. She has a master's degree in mathematics from WPI.

Michael Gagnon is a software engineer for Sanders Associates, Nashua, NH.

Stephen Laflamme is now a reactor engineer for Maine Yankee Atomic Power Co., Wiscasset, ME.

Stephen Lawry has been selected for the U.S. edition of *Who's Who in Aviation and Aerospace*. Recently promoted to first lieutenant in the U.S. Air Force, he is stationed in Albuquerque, NM.

Paula Mesite is studying for her MSEE in communications at MIT.

Matthew Powell is a system engineer at Ungermann-Bass, Burlington, MA.

David Roderick has been elected an "Outstanding Young Man of the Year" by the U.S. Jaycees and is listed in the current volume of the *Outstanding Young Men of America*. Besides WPI, he attended San Bernardino Valley College.

Mark Tino was a member of the Placement Seminar Panel held at WPI in November. He is employed by Arthur Andersen & Co., Boston.

David Weiss is a graduate student at Carnegie-Mellon in Pittsburgh, PA.

1981

MARRIED: Suzanne Call to Larry Margerum in Colrain, MA, on November 27, 1982. Suzanne is with Radian Corp., Durham, NC. Margerum graduated from Dartmouth and is a doctoral candidate at the University of North Carolina. . . . **Ted Nevells** and Joanne Divico on September 25, 1982, in Framingham, MA. Employed by a private nursing service in New Jersey, she graduated from Worcester's St. Vincent Hospital School of Nursing. He is an officer in the Civil Engineers Corps of the U.S. Navy. . . . **Thomas R. Strenk** to Robin D. Jussaume in Webster, MA, on September 5, 1982. She graduated from David Hale Fanning School of Technical and Health Occupations and is a medical assistant. He is with American Optical Co., Framingham, MA. . . . **David Torrey** and **Cynthia Nault, '82,** in Lynn, MA, recently. Cynthia is a systems engineer at Computer Control Systems in Dedham. David is a research assistant in electrical engineering at MIT. . . . **Andre L. Walker** to **Anne E. Caufield, '82** on July 24, 1982, in Lexington, MA.

Alan Amaral works as a systems analyst at Riley Stoker, Worcester.

Joseph Caola, a second lieutenant in the USAF, is stationed at Laughlin AFB, Texas.

Robert Daley, Jr., is an analyst in design engineering at Savery Tool Sales Co., West Hartford, CT.

Jeffrey Dick is a measurement systems engineer at Corning (NY) Glass Works.

Larry Nelson, who is with Fenwal, Inc., Ashland, MA, also has an independent consulting business, Nelson Research.

Continuing with Chevron Research, **Jeff Trask** is a coordinator of land-farm (waste disposal) research activities for the Richmond (CA) firm.

Gary Winer attends New England School of Law in Boston.

1982

MARRIED: Michael J. Balinskas and Nancy J. Friedmann in New Britain, CT, on October 2, 1982. She graduated from St. Joseph College, West Hartford. He is with United Illuminating Co. . . . **Timothy C. Barry** to Elizabeth A.

Dick Bratt and his warm-up bats.

Bratt's Bat Is Making a Hit!

In 1982 the American League (AL) hit nearly 40 percent more home runs than the National League, climaxing a six-year upward trend in AL home run superiority. A fluke? Dick Bratt, '59, doesn't think so.

Dick is president of Bratt Corp. of Holden, MA, a firm which makes weighted warm-up bats. Since 1979 he has been giving the American League the exclusive use of his bats, and the upsurge in AL home runs has been astonishing. In one year alone, the AL home run total went from 1,140 to 2,007!

Who uses Bratt's bats? Jim Rice of the Boston Red Sox, for one. And George Foster, formerly of the Cincinnati Reds, for another. Before 1979 both leagues used the bats, and both players were home run champions for their respective leagues in 1977 and 1978. Rice is quoted as saying, "I might have hit a dozen fewer home runs and 20 to 30 [percentage] points lower if I hadn't discovered this bat." He says he likes it because it's balanced.

Bratt, a product engineer at Norton Co., Worcester, contends that his balanced, weighted bat is better than the conventional hard-rubber doughnut model for building strength and loosening muscles.

"If you use a doughnut, the end-weighted bat swings itself," he says. "With the Bratt bat, you have to move the bat yourself."

The bat, developed by Bratt's late father, Leonard, has an ash handle. Its plastic barrel is filled with sand or alumina zirconia. Foam and a wooden plug hold in the sand. Used for exercise—not hitting—the bat comes in nine weights, from 45 to 90 ounces.

Bratt, a die-hard Red Sox fan, has great confidence in his company's product, because he feels it produces results. He reports, "We were watching the '75 World Series on TV, when Bernie Carbo hit a pair of pinch-hit homers for the Red Sox. Both times they showed him using our warm-up bat before he went to the plate. We celebrated until four in the morning!"

Grazioso in Quincy Center, MA. She graduated from Assumption College, Worcester. He is employed as a systems consultant. . . . **Dale Beaver** to Paula Hernigle in Canajoharie, NY, on August 21, 1982. A registered nurse at the Memorial Hospital in Worcester, she graduated from Fulton Montgomery Community College and attended Albany Medical Center School of Nursing. . . . **Lewis S. Cannon** and Celeste J. Tanguay on October 2, 1982, in Suffield, CT. A recreation director for Wintonbury Manor, Bloomfield, she graduated from Montclair State College in New Jersey. Cannon is a civil engineer for Roncari Industries, East Granby. . . . **Matthew Fratantonio** to Laurie E. Taragowski in Hamden, CT, on October 29, 1982. A registered nurse, she graduated from Massachusetts General Hospital School of Nursing, Boston. He is a product engineer at Pollak Co., also in Boston. . . . **Patricia L. Gauvin** to Joseph A. Corriveau on October 9, 1982, in Dudley, MA. She is a computer programmer at Pratt & Whitney Aircraft in East Hartford, CT. Corriveau graduated from Tantasqua Regional High School and is with Hyde Manufacturing, Southbridge, MA.

MARRIED: Scott Harris and **Jody Edelman** on August 8, 1982, in Buffalo, NY. Jody does graduate work in mechanical engineering at WPI. . . . **Stephen P. Jolicoeur** to **Debbie L. Madamba** in Worcester on July 24, 1982. . . . **R. James Nunn** and Ann M. Naillis in Wallingford, CT, on October 16, 1982. She graduated from St. Joseph College and is a registered nurse at Mt. Sinai Hospital. He works for Emhart Corp. . . . **Robert A. Poole** to Linda L. Budney on September 26, 1982, in Worcester. She graduated from Worcester State College. Poole serves as a process engineer at Alloys Research, Inc., Bristol, NH. . . . **Douglas J. Towart** and **Kerri Ann Tegan, '84,** in Milton, MA. He is with GE in Pittsfield. . . . **Philip I. Wengloski** and Ann M. Hesse on September 25, 1982, in Lebanon, CT. A medical assistant secretary, she graduated from Trinity College. He serves as a reactor transient performance analyst at Combustion Engineering in Windsor.

Brandt Bonin is studying for his master's in chemical engineering at Drexel University in Philadelphia, PA.

Steve Brodeur works for Hughes Aircraft in Anaheim, CA.

Kingsley Brown is at RPI in Troy, NY, studying for his master's degree in electric power engineering.

John Calhoun works in the management information consulting division at Arthur Andersen & Co. in Boston.

The Florida Power and Light Company of Juno Beach, FL, has named **John Dougherty** as an electrical engineer.

Thomas Fitzgerald III is a patent officer with the U.S. Patent Office, Arlington, VA.

Rene Fontaine has joined Codex Corporation in Mansfield, MA, where he is an associate engineer in the network control products development group.

Dennis Grimard does graduate work in quantum electronics at the University of Michigan in Ann Arbor.

Lynn Gustafson has accepted the post of process manufacturing engineer at Corning Glass Works in Muskogee, OK.

Dianne Leahey has joined Kimberly Clark in Anaheim, CA.

Currently **Stephen LeViness** works at the Academy of Science in Budapest, Hungary, as part of his master's program in chemical engineering at WPI.

Neil Mager, a mechanical design engineer with Teledyne in Waltham, MA, is an analyst for nuclear plants.

Richard Maynard is employed by Digital Components Group, Marlboro, MA.

Gail Miranda has been named a junior member of the technical staff at ITT Avionics, Nutley, NJ.

Michael Nallen has joined Babcock and Wilcox in Lynchburg, VA.

Formerly employed by Stone & Webster, Boston, **Margaret Newcomb** was recently transferred to Waterford, CT, with Millstone.

Ann Noga continues as a process engineer for fluorescent lighting products at GTE Sylvania in Danvers, MA.

Steven Oxman, who holds an MS in computer science from WPI, is now the principal computer scientist with the NATO program in the Hague, the Netherlands.

Michael Sciascia attends graduate school at Virginia Tech in Blacksburg.

Donald Soubie works at the Aberdeen Proving Grounds.

Dr. **Helen Vassallo,** who has an MBA from WPI, has been named an associate professor of management and biology at WPI. She had been director of scientific and professional information at Astra Pharmaceutical Products, Inc., Worcester. She holds two degrees from Tufts and a doctorate from Clark.

Stephen Zimmerman is a research assistant in the chemical engineering department at UMass, where he is pursuing a master's degree.

Ann Noga, Class Secretary

School of Industrial Management

Walter Gonia, '64, is director of marketing at Flexonics Division of UOP in Bartlett, IL. . . . **William Barlow, '65,** who received the 1982 Albert J. Schwieger Award from WPI's School of Industrial Management, has been elected a director of Wyman-Gordon Co. He is executive vice president of the forgings company, which he joined in 1943. Previously he was vice president and general manager of the eastern division. . . . **Peter Leasca, '65,** continues as a financial consultant for Shearson American Express in Worcester. An adjunct professor at Worcester State College and Quinsigamond Community College, his lectures cover the stock market and money management.

Natural Science Program

Rufus Stacey, '70, has been appointed an instructor of industrial education at Keene (NH) State College (KSC). Stacey has a bachelor's degree from KSC. Previously he taught vocational electronics at Cheshire Vocational Center in Keene and in-service electronics for Markem Corp., also in Keene, as well as radiation physics and electronics at the Cheshire Hospital School of X-Ray Technology.

COMPLETED CAREERS

Frank Forsberg, '15, a retired chief metallurgist and consultant to the Gillette Co. in Boston, died on October 29, 1982, in Worcester. He was 89.

A Worcester native, he graduated with a BSCE. He belonged to Sigma Xi and Tau Beta Pi.

During his early career, he worked for the American Steel & Wire Division of U.S. Steel. From 1943 to 1958, he was chief metallurgist for Gillette Safety Razor Co.

Mr. Forsberg belonged to the American Society for Metals, the American Institute of Mining and Metallurgical Engineers, the American Socicty of Swedish Engineers, the Masons and the Tech Old-Timers. He was a registered professional engineer in Massachusetts.

Earl R. Smiddy, Sr., '26, died December 19, 1982, in Framingham (MA) Union Hospital at the age of 80. He was born on September 16, 1902, in Southborough, MA.

After receiving his BSEE, he was for many years with Gamewell Co. and Honeywell, both in Newton. A registered professional engineer in Massachusetts, New Hampshire and Connecticut, he retired in 1970.

Besides being a member of Theta Chi, Mr. Smiddy belonged to St. Matthew's Church and the American Legion of Southborough, the New England Fire Chiefs' Association, the Professional Engineers Association and the International Municipal Signal Association. In World War II, he served as a lieutenant commander in the Navy.

Howard B. Thomson, '26, passed away on November 13, 1982, in Clearwater, FL. He was born on June 9, 1902, in Worcester.

Following his graduation as an electrical engineer, he joined New York Telephone. In 1966, he retired as a supervisor for the firm in Syracuse. In 1968, he retired permanently from Thomson Associates (building engineering).

A professional engineer in New York State, Mr. Thomson was active with the Boys' Club, the Masons and various church choirs. He belonged to Theta Chi, Skull and the Poly Club.

Edward F. Cahalen, '27, a retired chemist, died on November 27, 1982, in Livermore, CA. A native of Lenoxdale, MA, he was born on May 27, 1901.

During his career, he was with Seamless Rubber Co., New Haven, CT, Ross & Roberts Co., Stratford, and Van Lew Rubber Co., New Haven, from which he retired in the 1960s.

A member of ATO, Mr. Cahalen had served as president of the New Haven chapter of the WPI Alumni Association, as council representative and as class treasurer. He was a past president of the Fathers' Club of Notre Dame High School in New Haven and a member of St. Peter's Church. He was the father of **Paul Cahalen, '63,** and **John Cahalen, '67.**

Frank S. Finlayson, '31, of Brewster, MA, a

retired professor of mechanical engineering at WPI, died on November 29, 1982, in New England Deaconess Hospital, Boston, MA. He was born in Worcester on November 6, 1908.

He received his BSME in 1931 and his MSME in 1945. Joining the WPI staff as an instructor in 1937, he was named assistant professor in 1943, associate professor in 1947 and professor in 1958. He retired in 1974.

A research analyst, consultant, and author, during his career he was associated with Harrington & Richardson, Inc., Alden Hydraulic Laboratory, Harvard University, Whitin Machine Works, L. J. Barrett Co., Rice Barton Corp. and Allis Chalmers Corp.

In 1960 Prof. Finlayson participated in the first conference on engineering design education at Case Institute. He belonged to the ASME, the American Society for Engineering Education, the Tech Old-Timers and Sigma Xi. During World War II, he taught flying at Grafton Airport. He was the father of **David Finlayson, '61,** and **Dana Finlayson, '67.**

Walter Rutman, '30, a Rhode Island publisher, died December 8, 1982, in Providence at the age of 74.

A native of Worcester, he received his BS in chemistry. He belonged to AEP.

Mr. Rutman owned the Herald Press, publisher of the *Rhode Island Herald,* and Ondine Publishing Company. Formerly he was the owner and publisher of *The East Providence Post* and *The Seekonk Star.*

He was a member of the New England Press Association, the National Association of Photo Lithographers and the Ledgemont Country Club. An honorary board member of Sandy Lane Country Club in Barbados, he also was an honorary director of Trinity Square Repertory Company.

Edward H. Rouse, '31, of Saint Louis Park, MN, died on October 5, 1982. He was born in Bristol, CT, on July 18, 1907.

Graduated as an electrical engineer from WPI, he belonged to Sigma Xi.

During his career, Mr. Rouse was with Factory Insurance Association and Automatic Sprinkler Company of America, from which he retired in 1958.

Mr. Rouse, a registered mechanical engineer, was a member of several professional societies, as well as the Masons and of Shriners. He was the brother of **Wesley Rouse, '36.**

Donald S. Clough, '35, of Andover, CT, passed away on November 23, 1982, a few days before his 71st birthday.

For many years, he was with Pratt & Whitney Aircraft, East Hartford, from which he was retired as assistant design project engineer.

A member of Theta Chi, he also was active in the PTA and the Boy Scouts.

Adam Z. Pizan, '36, a retired civil engineer from the Massachusetts Department of Public Works (DPW), died at his home in West Boylston, MA, in December. He was 69.

With the exception of military service in World War II, Mr. Pizan had been with the DPW since 1937. He retired in 1978.

A Navy veteran, he served as a chief carpenter's mate in the war, holding the post of construction inspector on the Panama Canal during major lock construction.

FEEDBACK

Editor:

I enjoyed the article "The Plan: Is It Working?" in your October 1982 issue. As a member of the class of 1976 I can look back on the advantage of having project work as an integral part of my undergraduate education.

I would like to point out an error on p. 12 in the article which perhaps dilutes the impact and innovation of what an IQP [Interactive Qualifying Project] can be. The picture of the "computer science major" with the "fourth graders" at a computer terminal was taken on a field trip to the computer center at WPI as part of an IQP under the guidance of Prof. L. H. Berka of the Chemistry Department. The photograph, however, was taken in 1975. Those fourth graders are now seniors in high school with some of their college applications potentially now in at WPI.

Home computers were virtually nonexistent when this photograph was taken. In the December 1982 issue of *Scientific American*, an article on personal computers states, "In 1975 a device flexible enough to be considered the first commercially available personal computer was developed by MITS, Inc." This year the personal computer market is expected to approach $3 billion in sales. Through an IQP, the students in that picture had their first experience with a programmable machine in a world which is now surrounding them with such devices. I hope and believe they are the better for it.

I feel that the IQP is an important part of the Plan and enjoyed the freedom I encountered with mine.

Yours truly,
the *Chemistry* major in the picture,
Walter X. Zukas, '76

Mr. Pizan, a Worcester native, belonged to the Massachusetts Society of Professional Engineers and Registered Surveyors.

Ravindra L. Kirloskar, '38, a well-known industrial leader in India, died in Kuala Lumpur on November 4, 1982.

He was born on January 14, 1917, in Kirloskarvadi, India. After receiving his BSEE, he spent two years as a graduate student apprentice at Westinghouse Electric, East Pittsburgh, PA. He then joined Kirloskar Brothers Ltd. in Kirloskarvadi. In 1947, he became the founder and general manager of Kirloskar Electric Co., a large manufacturer of electric motors in Bangalore, India. At the time of his death, he was chairman and managing director.

In 1974, Mr. Kirloskar received the Robert H. Goddard award from WPI. He had been an associate member of the AIEE and president of the Institute of Management, as well as president of the Quality Control Association. He was the father of **Vijay Kirloskar, '74.**

Dr. **Arnet** "Larry" **Powell, '38,** died at his home in Wayland, MA, on November 23, 1982. He was 67 years old.

A native of Worcester, he graduated as a chemist. In 1940 he earned his MS from WPI and in 1956 his PhD from Clark University. He completed postdoctoral work at Oxford University in England.

During his career, he was with Dow Chemical Co., Sylvania Electric Products, Inc., and the Office of Naval Research in Boston, where he served as deputy director and chief scientist. He retired from the Office of Naval Research in 1979, following 32 years of federal service.

A member of Sigma Xi, Dr. Powell was also a former officer and national committee member for the ACS. He was affiliated with the American Academy of Sciences, the New York Academy of Sciences, the American Association for the Advancement of Science, the Kiwanis Club, the Masons and the Methodist Church.

Dr. **Irving A. Breger, '41,** a research chemist with the U.S. Geological Survey for 28 years, died in Washington, DC, on October 13, 1982. He was 62 years old.

He was an authority in geochemistry, especially in the study of the relationship between fossil fuels and uranium. He retired from the Geological Survey in 1980. Since 1975, he had been a consultant to the Los Alamos scientific laboratory. At the time of his death, he was editor of *Organic Geochemistry*, a technical publication.

A native of Boston, he received his BS in chemistry. Later, he received his master's degree and PhD from MIT. A member of Sigma Xi, he had also been awarded Fulbright and Guggenheim fellowships. He belonged to AEP.

A fellow of the American Institute of Chemists, he had also belonged to the American Oil Chemists Society and the International Association of Sedimentologists. He helped to establish the geochemistry division of the American Chemical Society.

J. Lawrence Krause, '41, a lifelong resident of Millville, NJ, died on October 26, 1982, at the age of 64.

Graduated as a mechanical engineer from WPI, he belonged to Lambda Chi Alpha.

In January of 1982, Mr. Krause, a utility maintenance engineer, retired from Wheaton Glass Co., Millville, where he had been employed for 38 years.

Mr. Krause had previously belonged to the ASME and ASLE. Active with the Methodist Church, he was a charter member and past president of the Y's Men's Club, as well as a charter member and assistant director of the local American Legion chorus.

During World War II, he held the rank of captain with the Army Air Corps.

YOURS FOR THE ASKING

—A firsthand look at what's happening on campus and what's new with your classmates and other WPI friends. PLUS

—Receptions . . . seminars . . . tours . . . get-togethers . . . sports . . . entertainment . . . and time to relax and savor the memories.

This and more at **REUNION '83, JUNE 2–5,** for the classes of '23, '28, '33, '38, '43, '48, '53, '58 and '63.

PLAN NOW TO ATTEND!

SPECIAL NOTE

CHANGE THE DATE: HOMECOMING '83—and REUNION for the classes of '68, '73 and '78—has been rescheduled for OCTOBER 1, not October 15, as had been advertised in the February 1983 *Journal* and elsewhere.

SAVE THE DATE: OCTOBER 1, 1983